LIFE

SPECIAL ISSUE

Off to the Moon

NEIL ARMSTRONG

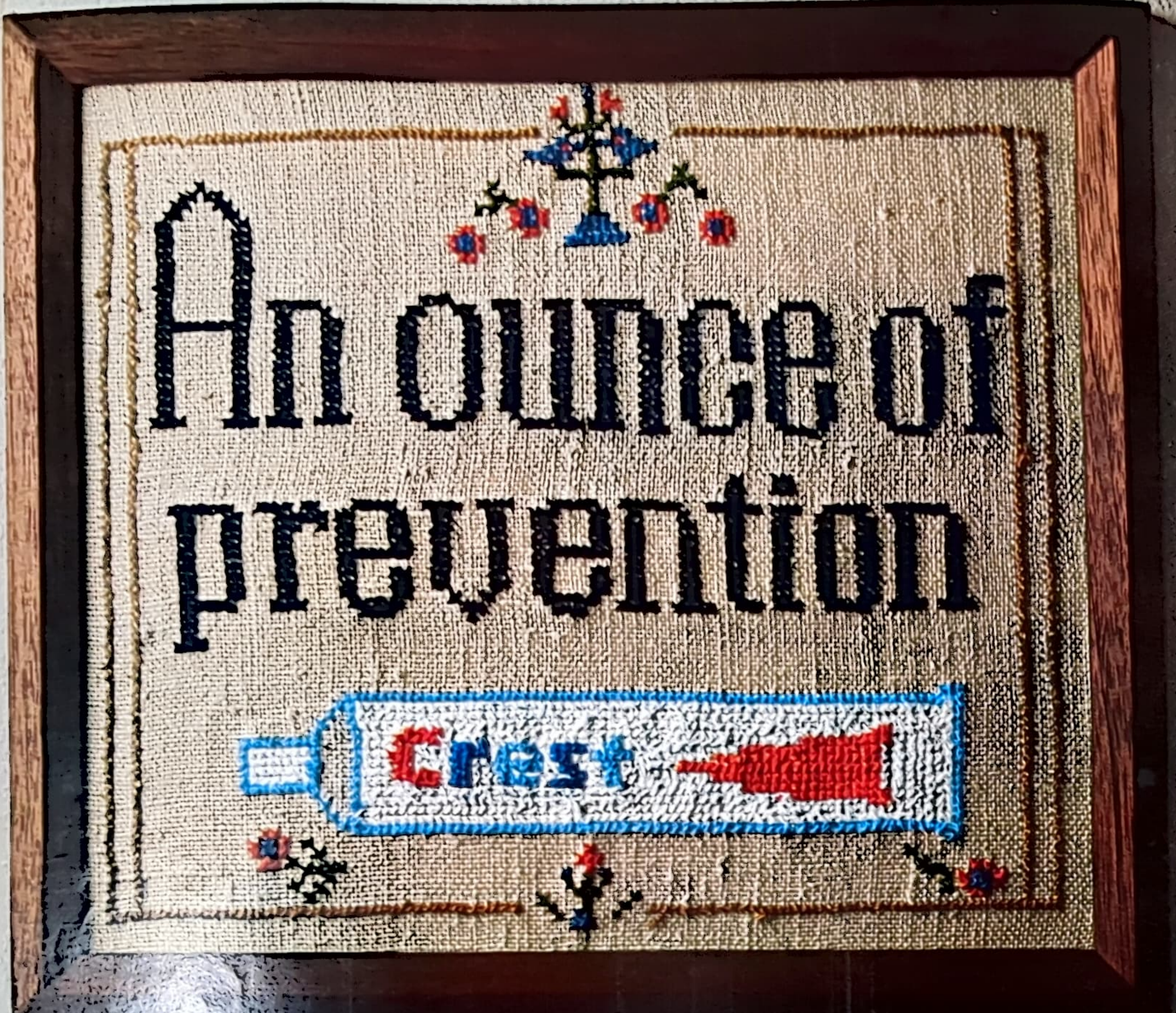
First Man
To Walk There,
and the Crew That
Will Make History

Lunar Grip
on the Tides

So Long
to the Old Lore

Message from
Charles Lindbergh

JULY 4 · 1969 · 40¢



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CONTENTS

Column 2B

Billy in the Garden. By Barry Farrell

Reviews 8-13

Book: *The Immortalist*, by Alan Harrington, reviewed by Webster Schott
Music: Johnny Winter, reviewed by Albert Goldman
Movie: Three New Juveniles, reviewed by Richard Schickel
Poetry: Elizabeth Bishop, reviewed by Charles Elliott

Letters to the Editors 16A

The Moon Ground 16C

A poem by James Dickey

Three Men Bound for the Moon 16D

Neil Armstrong refuses to "waste any heartbeats." By Dora Jane Hamblin
Buzz Aldrin has "the best scientific mind we have sent into space." By Gene Farmer
Mike Collins has cool to cope with space and the Easter bunny. By David Nevin

Mission Profile 30

In a painting, the flight of Apollo 11 from launch to lunar touchdown

Grip on the Tides 32

The beauty of seascapes tossed and sculpted by the pull of the moon. Photographed by George Silk

Tidal Creatures 43

Their very lives depend on the moon

Goodby, Old Moon 46

A wry and affectionate remembrance of what it used to be. By Paul O'Neill

The Lunar Laboratory 50

When they come back, the astronauts and their moon samples will be sealed off in a new $8.5 million complex in Houston. A close watch on the men and their prizes. By Dora Jane Hamblin

A Letter from Lindbergh 60A

Before the Apollo mission—and 42 years after his own historic flight—Charles Lindbergh writes a message

Miscellany 62

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COVER-HENRY GROSKINSKY exc. insert RALPH MORSE **2A**-GIL BARRERA **16D**-courtesy MRS. STEPHEN A. ARMSTRONG-courtesy THE COLLINS FAMILY **17**-lt. RALPH MORSE, rt. LEE BALTERMAN-courtesy THE ALDRIN FAMILY **18**-courtesy THE ARMSTRONG FAMILY, courtesy MRS. STEPHEN A. ARMSTRONG **19, 20, 21**-RALPH MORSE **22**-courtesy THE ALDRIN FAMILY **23, 24, 25**-LEE BALTERMAN **26**-courtesy THE COLLINS FAMILY **27, 28, 29**-RALPH MORSE **30, 31**-drawing by ARTHUR LIDOV **43, 44, 45**-FRITZ GORO **46**-collage by NAN ORSHEFSKY **48, 48B, 48D**-BETTMANN ARCHIVE **50** through **54**-drawings by DONALD MACKAY **55**-DON UHRBROCK **60A**-U.P.I. exc. l. right BETTMANN ARCHIVE **60B**-courtesy MRS. ROBERT H. GODDARD and ROBERT H. GODDARD LIBRARY, CLARK UNIVERSITY **61**-T. K. ADHYATMAN **62**-GEORGE SILK

July 4, 1969 Volume 67, Number 1

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EDITORS' NOTE

The man behind the glass mask

Life's coverage of the astronauts began more than 10 years ago with the selection of the original seven-man Mercury team. Today, 20 flights and splashdowns later, man is at last prepared for the moon landing he has speculated about for centuries. Hundreds of pages in many issues of the magazine have been filled with this great continuing adventure—its spectacular views, its superb technology, accounts of the missions by the astronauts themselves. In this special issue before the flight of Apollo 11, our lead story is devoted to the crew—Armstrong, Aldrin and Collins—and it contains a personal portrait of each man by three members of our staff, Dora Jane Hamblin, Gene Farmer and David Nevin. Hamblin and Farmer have covered the astronauts before, but for Nevin it was a new experience.

DAVID NEVIN

Asked for his own impressions after undertaking this assignment, Nevin wrote: "Until I met one, the image of the astronaut that came always to my mind's eye was of the man in space, floating rigid, his metallic suit inflated, his arms stiff as a doll's arms, his face covered with black glass through which the camera cannot see. I saw the faceless man who does the incredible by a marvelous but not quite human feat of engineering rote.

"Like so many fixed ideas, mine was silly. I went to Mike Collins' house on a blazing Sunday afternoon. The Houston air was wet and heavy but the yard was shaded by live oak trees; the grass needed cutting. I rang the bell and then Collins opened the door. He was wearing jeans cut off at the knees and sandals and one of those nondescript shirts that men refuse to throw away. We shook hands in the hard military way and he gave me a beer.

"We talked for two hours. I knew something about him already. He was an Army brat and had grown up on military posts, and so had I. He had started in fighters, which I also understood. Soon he had the pilsner glass, drained of beer for the purpose, cocked up on its side to illustrate the spacecraft's docking collar, and I could see him 10 years earlier using both hands, palms down, swinging wildly before him to demonstrate how two fighter aircraft would jockey for the killing position.

"Yet the mind he brings to space travel is subtle and penetrating. He dismissed the old saw about the merit of sending a poet into space to tell us what it *really* is like: a nice idea but the poet wouldn't survive, nor would the mission. And then we talked about fear and courage, fatalism and confidence, man's relation to his machine and to himself. We came finally to the mystical fact that there are men who do the extraordinary, and if they cannot specifically articulate their reasons, still it is plain they do not do it because they are without nerves or cannot imagine failure and death or have a simplistic faith in machines. As I walked out of his house that afternoon, I knew I had been with a remarkable man who was real and warm and whose face was very clear."

Ralph Graves

Ralph Graves
Managing Editor

by Barry Farrell

Billy in the Garden

Billy Graham came alive for me last Inauguration Day, when I started thinking of him as an American Rasputin. Before, he had seemed an innocuous presence, even while earning more than $10 million a year for his various evangelical enterprises—and perhaps especially while golfing or praying with every President since Roosevelt. But on Inauguration Day I had to grant that Billy must have some really eerie gift for politics, or politicians. For here was a man who had stayed with the Johnsons through every trying hour of their final weekend in the White House—and had then outstayed his departing hosts to be ready at the door with blessings and benedictions for the Nixons.

Not that Nixon hadn't had Billy's blessing all along. The two had been intimate friends for more than 20 years, and both have said, in public and in earnest, that the other would make a good President. During the campaign Billy thought it best to affect a churchly distance, but there were some rather major lapses, as when he introduced his old friend to a crusade audience in Pittsburgh as a man more realistic than Jesus. If any doubts remained after the election, they were dispelled forever when the new President revealed that Billy had talked him into running.

One was left to ponder what else Billy might be able to talk him into, and for me the question was unsettling enough to recall Rasputin's haunting name. The idea of a revivalist once again holding spiritual sway over a sovereign, *our* sovereign, was far too intriguing to be dismissed because of obvious contrasts between Billy and Rasputin—one a barely literate peasant, the other a Doctor of Humanities from Bob Jones University; one a wicked Russian madman, the other foursquare on the side of American good. Leave it to Nixon, I told myself, to come up with a safe and sane Rasputin.

My own acquaintance with Billy was limited to attending two of his Crusades—Seattle in 1951, in the tow of my aunt, and New York six years later, when Billy was at the height of his powers, packing Madison Square Garden nightly for 16 weeks. I wandered in on impulse one night and, after climbing up into the final godless reaches of that sinister place, I was amazed to look down from the distance of a city block or so and recognize Billy away from the pulpit by the clear pale blue of his eyes. Now, with Billy back in New York for the 10-day Crusade just ended, it seemed a cautionary move at the very least to see how the years had touched him.

It was a new and different Garden, a vaulting, pillarless arena of color-coded plastic seats, 20 blocks downtown from the old site; elevators and escalators took me to the Crusade Press Lounge, where I was issued a small brass badge saying MEDIA and a handsome press kit containing glossy photos and glossy biographies of Billy and the whole evangelic team: Cliff Barrows, George Beverly Shea, Grady Wilson and his brother T.W., Crusade Director Bill F. Brown (". . . and what a Giant for God that man is!" Billy said later on). A copy of *Decision*, Billy's monthly magazine, was opened to an article called "God in the Garden," that told how Crusade advance men had spent two years organizing 1,200 churches in the metropolitan area into "an uptight force determined to drive a wedge into the secular glob." The 2,000-voice choir was singing *Trust and Obey* as I entered.

Billy was sitting well back from the hydraulic pulpit on a portable stage crowded with dignitaries' chairs and banked on all sides with false shrubs and ferns. His face was tan with the sun of Key Biscayne, where he had spent the weekend with the President, resting up for the Crusade. Four serious illnesses in recent years have made him watchful of his strength, but from the look of him it is easy to see why many of his followers believe him to be preserved by the purifying fire inside. He is 50, but with just a touch of TV makeup, he still looks 35.

His sermon, timed for the 12-city "television outreach" that brought the Crusade "to millions upon millions of American homes," was another feat of preservation: the same glad voice, the same elucidating gestures, the same good-news Gospel. Some of his metaphors, though, were almost painfully contemporary (God is the infinite "heart donor"; our struggle is with "rejection"), and, like so many others these days, he seemed obsessed with the problems of sex and dope.

Night after night he returned to the attack on pornography, sensuality, lust, "trips of alcohol, sex and dope." Times Square, he said, was "an open sewer" of depravity and vice, and he warned that "no city in history, no nation in history, has ever gone in for that kind of immorality and withstood the Judgment of God." Student revolt was another obsession—revolt, he said, is a sign that the End is near. Can Nixon believe this, I wondered.

Billy was more encouraging about the future of the big cultural sins. Dismayingly so, in fact. "We don't have a race problem," he said. "We don't have a poverty problem. We don't have a war problem. The problem, ladies and gentlemen, is sin, S-I-N." When Christ comes to redeem us (and Billy says "it could be soon"), illusory problems such as these will vanish, being nothing more than symptoms of our estrangement.

My days as a Times Square thrill-seeker ended when I was about 19, but hearing Billy talk about it in such vivid terms made me yearn to get up there the minute the service ended. A hot summer mist had polished the streets into broken black mirrors, and every doorway held a clammy nest of people waiting for the action to begin. As Billy had warned, there were a great many new pornographic bookshops, and all of them were crowded. "It's the rain," one dirty book dealer told me. "These bums never buy nothin'." In the back room, a dozen men were plugging quarters into peepshow machines. "Echhh, Jersey commuters, waiting for the bus," the dealer said.

It might have been Billy's doomsday preaching that made the famous street of shame seem so vacant and gloomy. But for all the facets of misery and breakdown, I couldn't find a trace of simple lust. I prowled around for a couple of hours, then headed for the subway home. On the way, I bought a sailor hat for my daughter in an all-night penny arcade; and while watching the lady sew "Anny" on the brim it struck me hard that this was the best thing I'd done all day.

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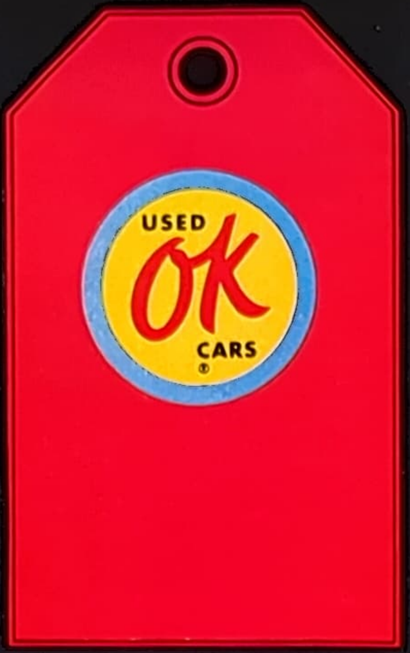

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LIFE *BOOK REVIEW*

A Bold Plan to Abolish Death?

THE IMMORTALIST
by ALAN HARRINGTON
(Random House) $6.95

We have places for people like Alan Harrington. Sometimes it's a psychiatric ward. Other times it's a pedestal. Visionaries, radicals, revolutionaries almost always sound cuckoo in their own time. Later on they're civil saints. Either alternative can be argued from *The Immortalist*, Harrington's tract on "the engineering of man's divinity." But instead, why not enjoy the lovely fantasy and thank novelist Harrington (*The Revelations of Dr. Modesto, The Secret Swinger*) for planting hope when most literary intellectualism sows black despair? We need all the optimism we can get. Harrington, really optimistic, suggests we start thinking about the possibility of living forever: "Death is an imposition on the human race, and no longer acceptable." Eventually he gets around to why this crazy-sounding proposal possesses a distant reasonableness.

At least two thirds of the new Harrington is a luxuriously written, slightly manic restatement of self-evident truths about our strategies against death. We think, act, pretend as if we will live forever, and everything in human experience is powder for Harrington's explosion of this psychological axiom. Rebellions, business enterprises, customs, institutions, habits, philosophies, superstitions, science, art—all manifest man's undying competition with death.

Civilization is "reporting an emotional displacement," Harrington says, and "the illness may be identified . . . as the fear of aging and death. All else is peripheral and finally unimportant. . . . Death alone, all by itself, may be what is at the core of the human neurosis." With Dostoevsky, Harrington believes "man simply invented God in order not to kill himself." He says the hippie movement "should be understood . . . as an attempt to achieve immortality now: freedom from time, money, history and death." The criminal achieves a sense of immortality by leaving a scar on society. The goal of the artist is (as Faulkner says) "to arrest motion . . . by artificial means and hold it fixed so that a hundred years later, when a stranger looks at it, it moves again since it is life." Our captains of industry and chiefs of state "struggle along with the others to enshrine themselves alive in great or miniature halls of fame." As for sex: "Simultaneous death and transfiguration, completely out of control. The little death in what Unamuno calls 'the genetic spasm' makes all things new again." Even the idea of evil Harrington attributes to our lust for everlasting life: "The satanic spirit inspired our resistance to annihilation, resisting God's truth, because God's truth instructs us to forgive death in this world." And that's the problem. That's why we must find options to death, Harrington says. Pressure to create facsimile immortality is so great we're in danger of blowing our minds. LSD, marijuana, alcohol, sex orgies, sadistic violence, nuclear war, suicide beckon with "a kind of cosmic identification." We want salvation from death "by whatever means—and quickly."

Enter medical science to Harrington's alleluia chorus. Organ transplants, cryonics (cold storage of clinically dead bodies for possible restoration to life centuries in the future), human regeneration by unlocking DNA and RNA, research into the causes of aging all turn Harrington from celebrating anti-death intellectuals to reporting on the frontier actions of pro-life scientists. His chapters on the extension and possible re-creation of life may be the most accessible writing on this subject available. No souped-up eggheadery. Facts reported enthusiastically but with a certain cool. Short of government programs equivalent to the U.S. effort to reach the moon, only organ transplants can make any difference in the life expectancy of those who read *The Immortalist*. Meanwhile, anyone with at least $10,000 and a strong sense of purpose can buy a policy to assure his being packed in dry ice and perhaps recite a few rosaries for the advancement of science by the time he thaws out.

The unsatisfying truth is we are all going to die. Harrington knows it, despite the brilliance of his protests against it, despite the poetry of his scenarios dreaming a world in which age is reversed and existences are traded in for new ones. Finally, Harrington has to face it, too: How to get through today. What to do to create right now an ever-present in which life can be lived gloriously at what Richard Eberhart calls "that pitch near madness."

Alas, he has no prescriptions left over from experience, readings in science or his swinging novels. All he can offer are "indulgences so that during the final hours of the hunt [for immortality], we may enjoy every pleasure that mortal life has to offer." Like the missionaries who used to conduct retreats at my boyhood church in the southern Illinois coalfields, Harrington passes out gilt-edged holy pictures. Then he soberly takes up the collection. Reality again. Heaven, life everlasting, rests once more only on prophecy.

by Webster Schott

MUSIC REVIEW

It's Hard to Fake the True Blues

JOHNNY WINTER

Johnny Winter—the East Texas unknown record maker signed by Columbia for a record-making $600,000—is being ballyhooed as the Great White Hope of the current blues revival. White he certainly is: a pure albino glowing eerily onstage like the pop-art ghost of some long-gone black musician. Great he certainly is not, judging by his performance last February at the Fillmore East and his new album. Hope is a cop-out tag for a man who has been playing as many years as Winter and is still so far from self-discovery.

Mimetic is the word that fits his album, a one-man anthology that produces about the same effect as those fun-park photos that show the customer with his head stuck through a variety of pasteboard settings. On one track he's Ray Charles shouting gospel blues into the echoes of a trio of Amen girls; on another track he's Robert Johnson, twanging an acoustic slide guitar, growling and shrilling like a field hand; on yet another cut he's into one of those modish blues rave-ups perfected by Jimi Hendrix and The Cream—and so it goes until the whole spectrum of currently interesting blues has been Xeroxed.

What all this proves about Winter is hard to say. His material is monotonously conventional, the rhythm is pure sludge, the improvised variations are an endless squiggling and nervous rubbing-in of bluesy doodles, the words are either inaudible or trite. What Winter displays is a party entertainer's knack for taking off famous styles by surface mannerism.

Onstage Winter is a tall awkward kid entertaining a high school assembly. Face to face he is utterly without pretensions, a perfectly ordinary and not unattractive young man with an engaging enthusiasm for every kind of blues. He tells you ingenuously that he owns every blues record cut since the war and that he composes his original blues by taking a piece from one side and combining it with a bit from another. His hero is Robert Johnson, but the resemblance between the Dostoevsky of the blues, with his atonal pitch distortions, his spectral rhythms and visions, and this simple lad is pathetically slight.

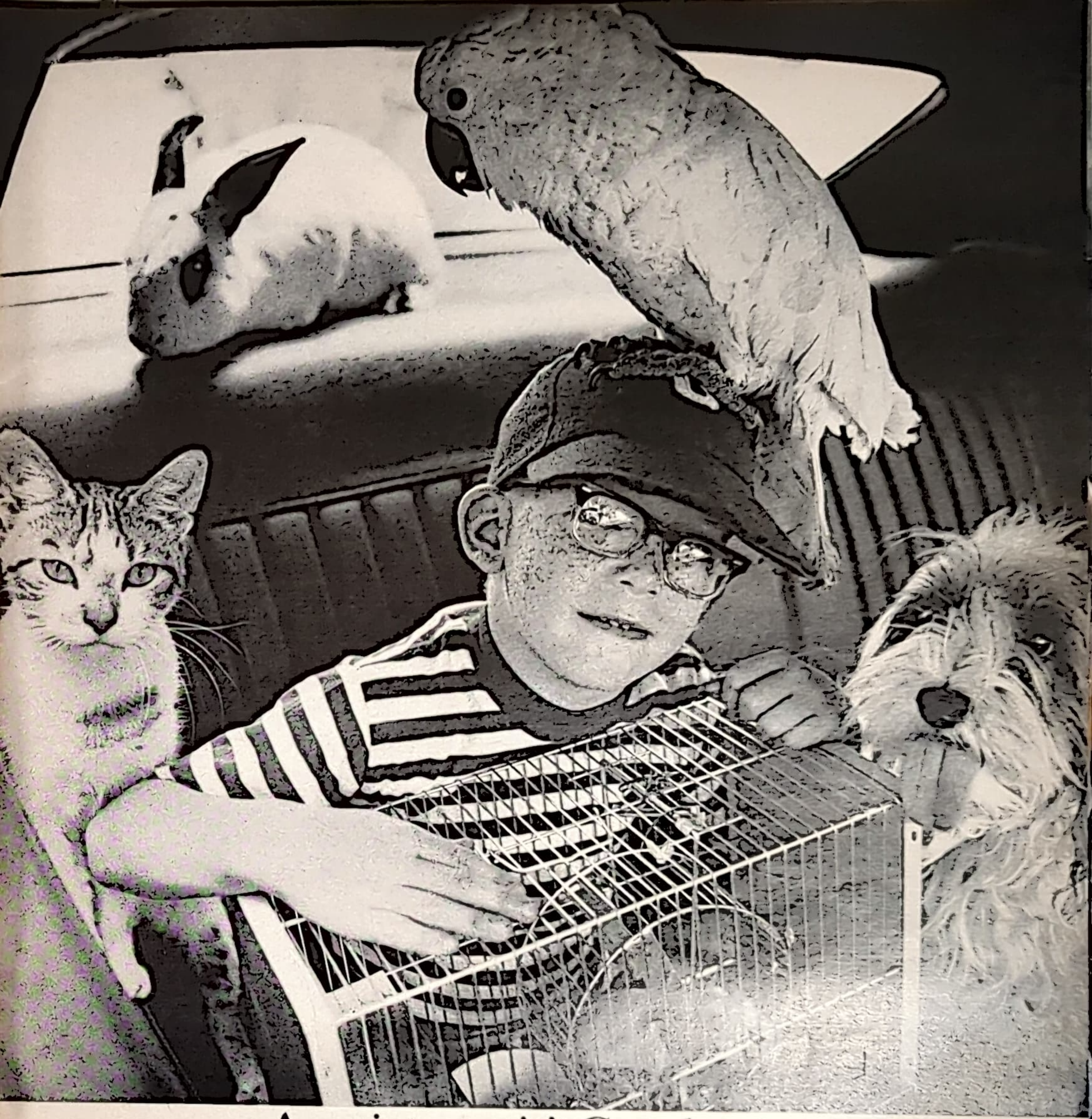
What the Johnny Winter story is really about is cult and cash. The white kids have tired of rhythm-and-blues and want to get back to the parent styles with their richly ethnic words and sounds. They want to penetrate the heart of blackness, but they are finding the going difficult. Rhythm-and-blues was easy to take off because it was the Negro's own caricature of himself, an art of blatant exaggeration that lent itself to fakery. Traditional blues is a bare skeleton of form demanding to be filled from the greatest depths of suffering and wisdom. Every blues performer has to find his own voice and message, his own inflection of the universal language. Traditionally (Robert Johnson is the one great exception) this task has taken a lifetime.

Meanwhile, the big record companies can't wait for the slow development of an art. Geared to instant gratification, they've got to find a young white superstar to satisfy the current craving. The black artists, like B. B. King and Albert King, undisputed masters of the blues today, have obviously been discounted. Big, fat, middle-aged blacks are fine for distant viewing and listening, but when it comes to the erotic close-up, the real fetishistic obsession *à la* Tiny Tim (discovered by the same Steve Paul who unearthed Johnny Winter), you've got to have someone young and thin and cute and *white*.

What a pity that Columbia should waste money making blues Monkees when it could be educating the public to appreciate the blues classics. Why don't they ballyhoo their Robert Johnson album? Dead geniuses stay forever alive while ghosts drop dead in their tracks.

Mr. Goldman, a teacher at Columbia, reports frequently on popular culture.

by Albert Goldman



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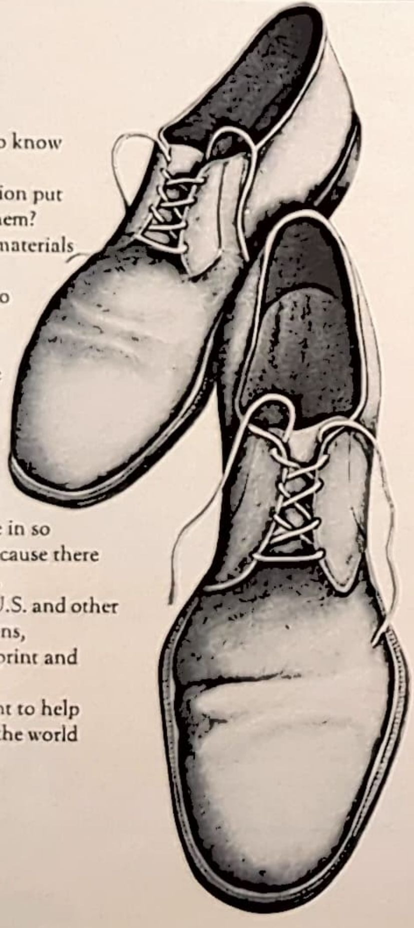


LIFE MOVIE REVIEW

Support Your Local (Good) Kid Films

THREE NEW JUVENILES

We keep insisting that, no kidding, we really, really want more and better movies for our children to see. But, no kidding, we really, *really* don't patronize the few that are made—excepting, of course, some of those that bear the Disney imprimatur.

Which makes this summer a period when (could it be for the last time?) the American movie industry will test the seriousness of our demand for good—or at least bearable—kid stuff. For, coincidentally, three major studios are releasing three major juveniles—*My Side of the Mountain*, *Ring of Bright Water* and *Run Wild, Run Free*.

They have in common an engaging modesty of intention, quiet (sometimes too quiet) intelligence of execution, excellent color photography and a certain astringency not usually associated with movies dealing in the relationship between men (and boys) and the natural world. At the very least they are all quite decent little films and one of them, *Run Wild, Run Free*, seems to me rather more than that.

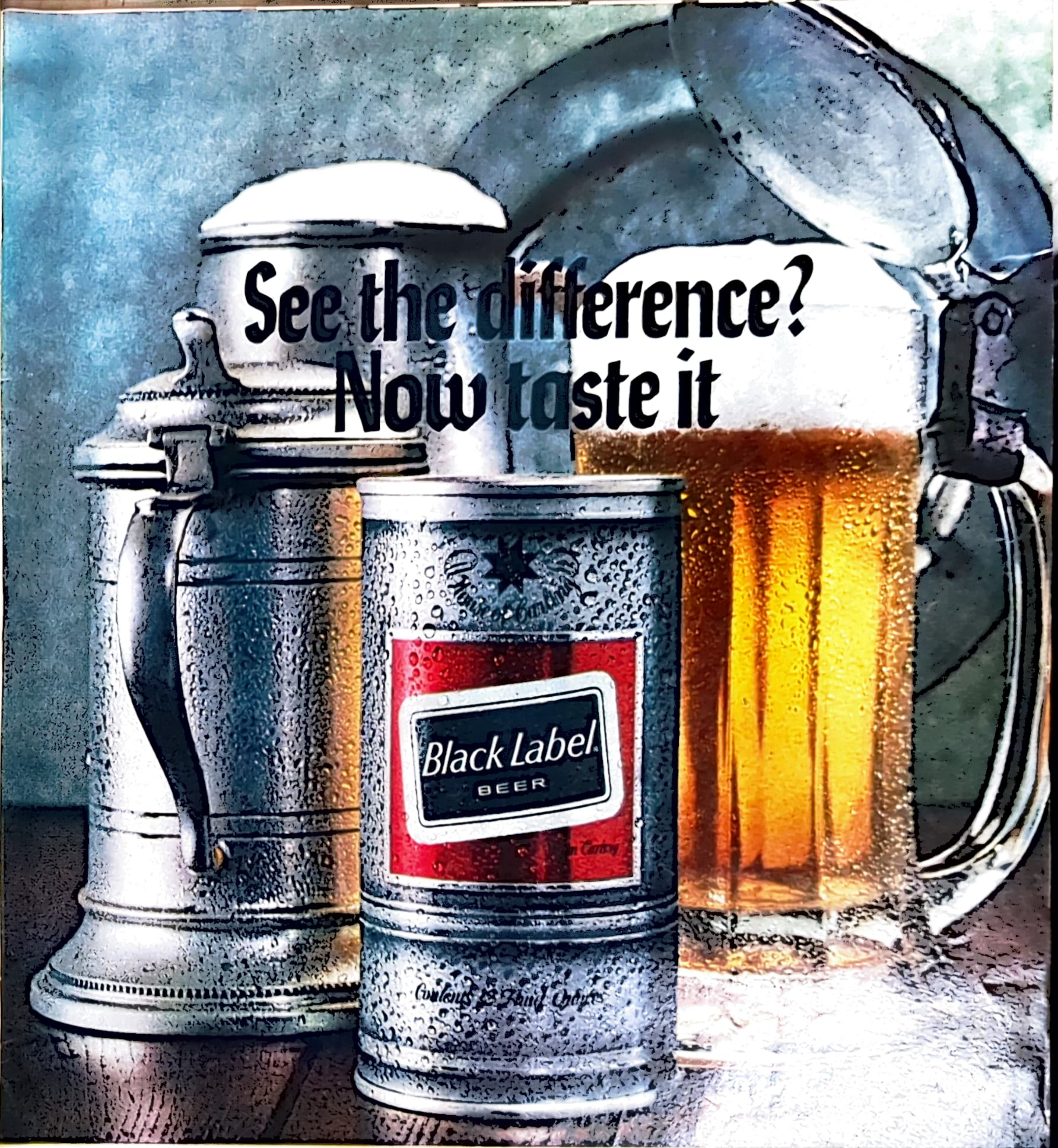
My Side of the Mountain has, perhaps, the most imaginatively appealing basic story—a small boy (charmingly played by Teddy Eccles) is possessed of both a precocious scientific sensibility and Thoreau's vision of the need for simplicity and solitude. He runs away from home, determined to live alone (except for a pet raccoon) and off the land in the Canadian wilds, keeping a diary, running some modest experiments. I don't know any child immune to the Robinson Crusoe fantasy and, I must admit, I've never outgrown my own fascination with it. The best thing about the film is the way it carefully details the building of a primitive, pint-sized fastness in the vastness.

What is disappointing about it is the stubborn refusal of those who made the movie to concede that this is, or should be, an epic—with dimensions of awe, terror, loneliness and self-discovery through self-challenge. Script and direction take the undramatic, unemotional way out of situations that naturally suggest these qualities. It is never coy or cute, but it does overstress the cozy qualities of camping out.

A similar flaw mars *Ring of Bright Water*, an adaptation of Gavin Maxwell's famous otter saga. To me there was something tauntingly inexplicable about the man and the passion of his involvement with these creatures. Impersonated by the likable Bill Travers (who wrote the screenplay with director Jack Couffer and Neil Paterson), strangeness is dissolved into eccentricity, and the hard, enigmatic center of the book softened by the introduction of a conventional, namby-pamby romance with a conveniently located lady doctor (Virginia McKenna). The Travers-McKenna team performed the same service for another odd animal item, *Born Free*, and they are so pleasant it is hard to fault them—especially when they are surrounded, as they are again here, by touching, funny animal footage and when their respect for the animalness of animals—*i.e.*, their right not to be anthropomorphized—is so manifest. Mijbil, the star otter, is stupidly, cruelly killed here, as he was in the book, and I suppose you should be forewarned about that. It caused a good deal of sober speculation among the kids I took to the movie, but I thought their talk seemed both healthy and purging. Children harbor a lot of anxious, half-formed thoughts about mortality and they seemed glad to bring them out in the open and examine them. Moreover, the directness with which the scene is handled makes up for the lateness of its arrival in an overlong picture.

Both of these movies deal with people using the natural world as an escape from the world of men. *Run Wild, Run Free* is precisely opposite. In it, an autistic child is brought out of his angry silence, learning to speak to and love humankind, by first discovering the need to communicate with two animals, a wild pony and a falcon he is taught to train by a naturalist (John Mills). The setting is the English moors, beautiful yet bleak. The boy is Mark Lester (who was "Oliver")—also beautiful, also bleak in his self-imposed isolation, his strange, yearning anger. There is a marvelous poignancy in this matching of place and character, a haunting, poetic quality to the film that its competitors—worthwhile, well-intended—do not achieve. Children will, I think, respond to this boy, for they all have their moments of autism as, indeed, do we all. Most important of all, it has what so few films for children have—the indefinable resonance of art. It may only be minor art, but in this field that is a major advance.

by Richard Schickel



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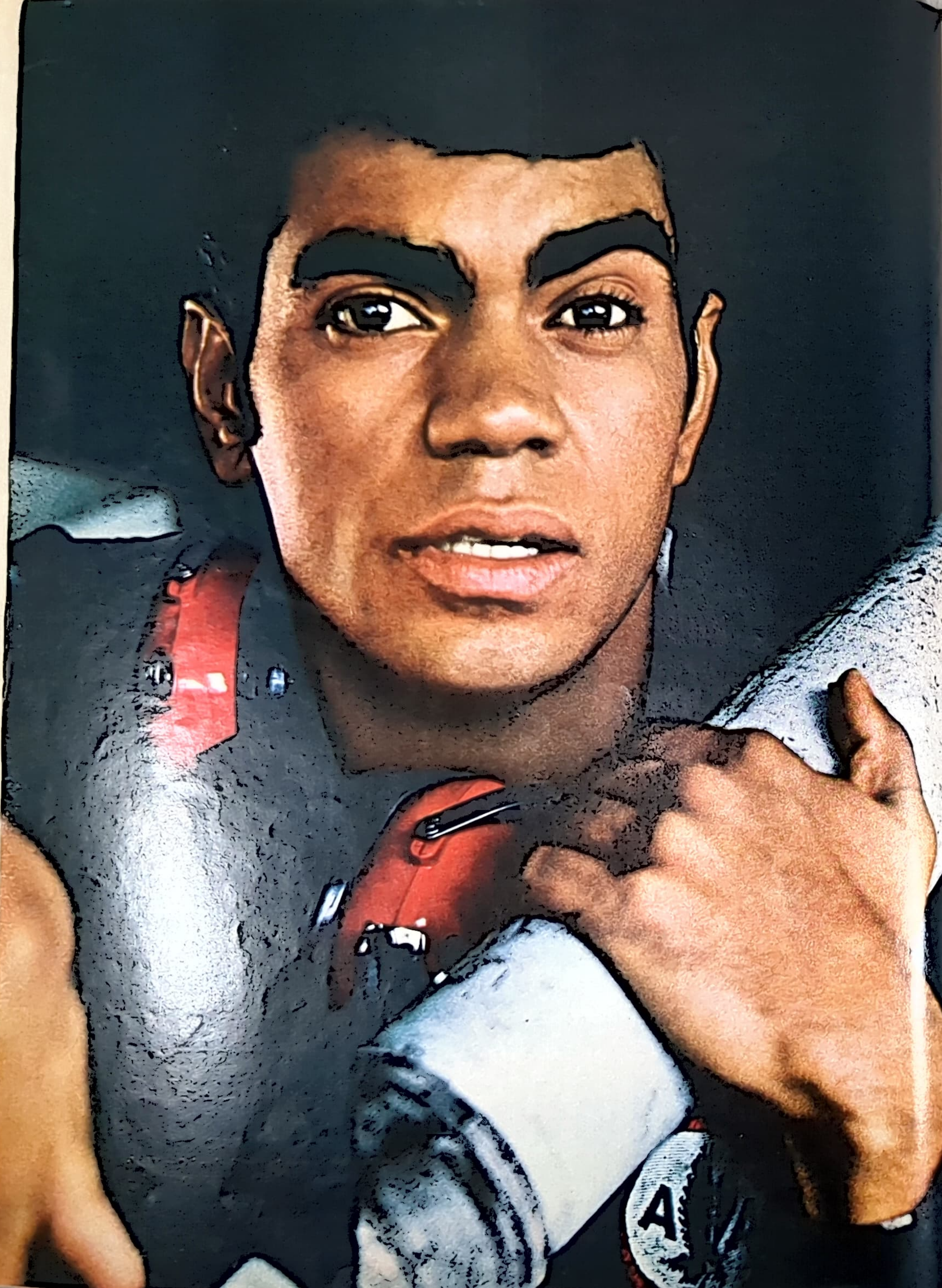

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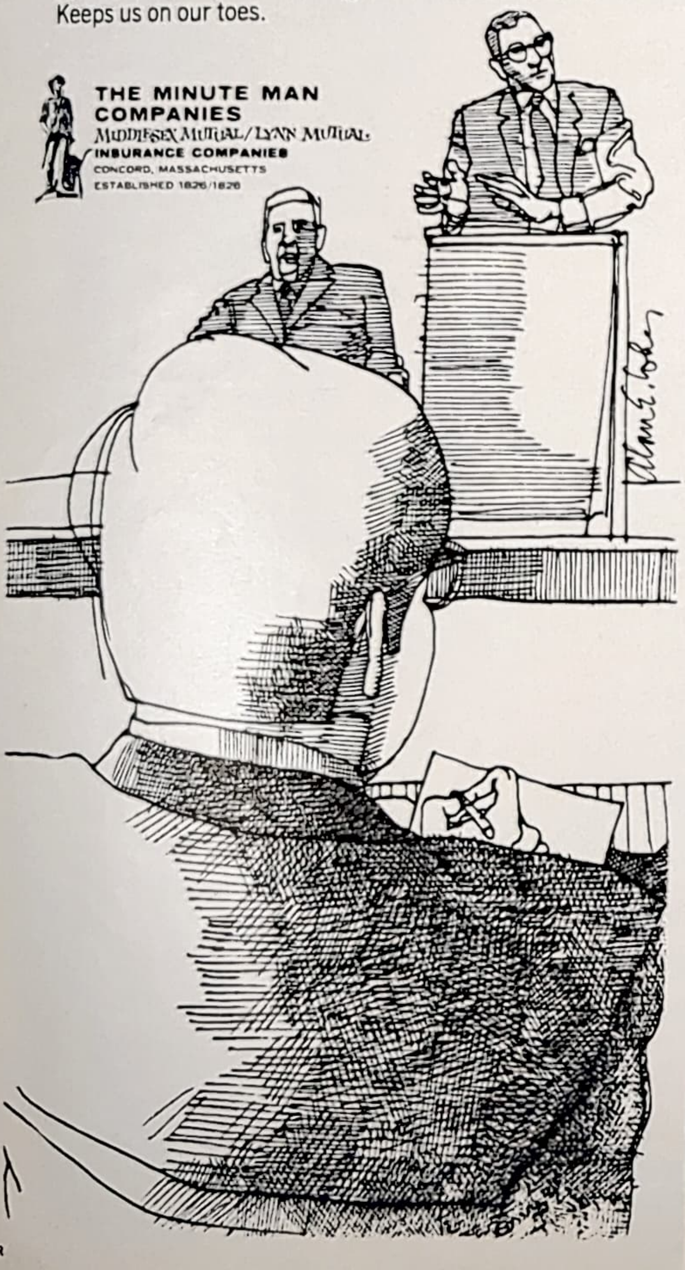

Changing Fashions in Paranoia

THE BLACK 'TAKEOVER'

The jingo thriller is nothing new. Purveyors of pulp have made much capital of (and out of) the white, Christian American hero fighting the Alien—red Indian, anarchist, Hun, Nip, Gook, Martian, Russian, Chinese—while saving the last bullet for *her*. In the early '60s, when American paranoids saw Russkies and Chinks under every porch swing, *Fail-Safe* and its legion of imitators introduced the "zap them before they zap us" concept to books bound in boards and selling for $5.95. Now the Red Menace and the Yellow Peril are bleaching out, as fashions in paranoia change, and a force of a different color is scaring hell out of the flinchy white.

In the moments in which we live right now, the word "black" is loaded with the unspoken "violent confrontation." The fictional account—the *science*-fictional account—of a black militant take-over in America has enough innate poison to make an uptight white population retch in fear. Three books I have read and one yet to be published are poisonously shouting "the fire this time," all falsely. Each will make its contribution to the growing feeling of fear and distrust between black man and white. Each panders to that fear and in turn feeds upon it, for profit. The white man in America in relation to the Negro stands somewhat like the Spartan to the helot. Secretly knowing his guilt, he constantly fears uprising. The headlines are ominous, and the figure of the white man's nightmare is a cross between Che and Cheetah, his face a black mask of hatred mixed with lust; he is trained in guerrilla tactics, cunning as a ferret, hung like a horse and madder than a wet hen.

This nightmare stands as the central figure of Edwin Corley's abomination, *Siege* (Stein and Day, $6.95); of a Dell paperback original entitled *Afro-6*, which I can only dignify by saying that it conforms to the *Siege* pulp pattern of exploitation; and, from the advance blurb from Doubleday on Fletcher Knebel's *Trespass* (October, $5.95), it would seem that the same nightmare is due to ride next fall. ("Surpassing all of his previous best-sellers in chilling suspense, Knebel projects the day black militants make their move—not in the ghetto but on the middle-class homes of white America.") As to the fourth, John A. Williams' *Sons of Darkness, Sons of Light* (Little, Brown, $5.95), I would like to give it one minute of silence.

Negroes are not Russians or Chinese, but American. They are not our antagonists in some nuclear race, they are the long-time sharers of our destiny. A novel like *Siege*, without heart or sense, asks the white reader to accept without question certain insidious and very dangerous ideas; to presuppose that, given money (by Peking), the first black choice is to arm for violence and murder, to ally with America's enemies, to blow bridges and tunnels and take over Manhattan (the bridges and tunnels go boom in *Afro-6* and *Sons of Darkness* too; heaven only knows what undermining and sapping Knebel has in store—the return of Robert Jordan?). How dare these writers *create* danger in a climate with enough clear and present danger to blow America higher than the bridges? Here is true pornography; lock it away from your sons and your daughters.

Of the four, John Williams is the only one with a talent worth discussing. *The Man Who Cried I Am*, despite its black paranoia, involved the reader with the terrible humanity of its people. But the people of this, his fifth novel, are marionettes with strings showing and broken. This is not a black novel, it's a white one. The menace in it is not Mr. Charlie (or "Chuck" as Williams calls him) but the Negro moderate, a eunuch, scrabbling a higher rung on the institutional ladder. The time is stated to be 1973, but nothing has advanced anywhere. A cop named Carrigan (read Gilligan) kills a kid in Harlem and blacks and whites warily wait for another "long, hot summer." Then somebody contacts a *mafioso* for a "hit" on Carrigan. The Mafia *don* subcontracts the hit to an (you're not going to believe this) Israeli assassin, formerly of Irgun. (1973?) After the contract is fulfilled, some minor hell breaks loose between the cops and the blacks in Harlem; heads get busted. At the end, the blacks are busy blowing those bridges and tunnels. Nothing is solved, nothing even suggested. A selected act of violence and gametime is over. Mr. Williams has copped out on the confrontation; his characters exist in a black vacuum, untouched by any whites except the cops. For him, too, like the others, violence is the "final solution."

Mrs. Fleischer is a free-lance writer and an editor of Publishers' Weekly.

by Leonore Fleischer

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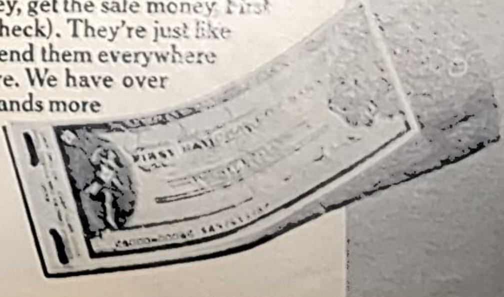

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Minor Poet with Major Fund of Love

ELIZABETH BISHOP

When Judgment Day arrives in the seminars of Elysium, Elizabeth Bishop stands a pretty fair chance of being put down as a minor poet. That's nothing to get upset about; rank among poets (as among novelists and corporation executives) is purely relative. If she lacks the power and range of Robert Lowell, if the late Randall Jarrell had a better dramatic style, if Marianne Moore can dance light-footed circles (to say nothing of pirouettes, arabesques and gargouillades) around her, if her entire 30 years' output, including translations, can fit rather loosely into a volume of 210 pages, as it recently has (*The Complete Poems*, Farrar, Straus & Giroux, $7.50) *still* nobody else's poetry is the same as hers, or in certain ways quite as good. She is a true poet, and in a day when we ought to have none at all—only the McKuens and the McCohens are paid, read or noticed—her very existence proves our undeserved blessedness.

"More delicate than the historians' are the map-makers' colors," she writes in *The Map*. There is no doubt which colors she prefers, or about her own predilection for the map-maker's role. Her world is at once like and startlingly unlike the real world. "These peninsulas take the water between thumb and finger/like women feeling for the smoothness of yard goods." A historian—or a more literal-minded poet—would never grant us such perceptions.

In a similar spirit Miss Bishop is pleased to seize a faintly illogical idea and march away with it right beyond the pale. She spots a misprint for "mammoth" in a newspaper and soon she is telling us about the peculiar creature called "The Man-Moth" who "thinks the moon is a small hole at the top of the sky" and who continually climbs up tall buildings trying to reach it. *The Gentleman of Shalott*, being (like everybody else) bilaterally symmetrical, is convinced that "his person was/half looking-glass,/for why should he/be doubled?" He is a bit worried about which half is real and which half mirror, because "if half his head's reflected,/thought, he thinks, might be affected."

Yet she never becomes arch or frivolous. There is a current of principle flowing along underneath all Miss Bishop's poems, a kind of sobriety of intent if not form. It consists of sympathy for humanity (and sometimes wild creatures), a fascination with words, a sense of place and time, an enormous fund of love. Virtually lacking—most unusual of all—is any hate, or anger, or self-disgust.

Which is not to say that she lacks strong feelings. In *The Armadillo* she describes how in Rio a paper fire-balloon, sent aloft at night, fell and "splattered like an egg of fire/against the cliff behind the house," burning an owl's nest, frightening an armadillo, turning a baby rabbit into "a handful of intangible ash/with fixed, ignited eyes." The tone is curiously gentle, but it conveys a knowledge of pain as acute and hideous as if the victims were Vietnamese peasants under a rain of napalm.

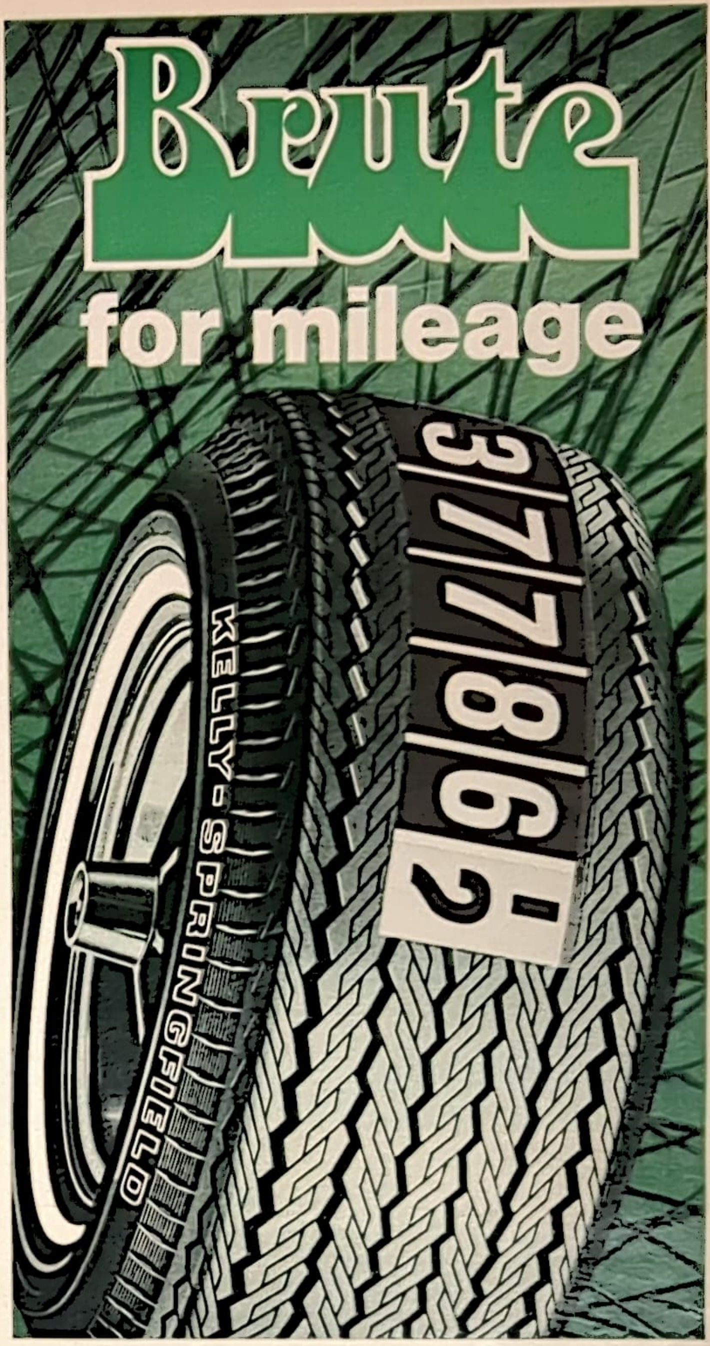
Miss Bishop sometimes adopts another's voice as in little Jerónimo's hymn to his house ("my gray wasps' nest/of chewed-up paper/glued with spit"), whose existence, like his own, is marvelously tenuous. But usually the voice is her own, the voice of a much-prized, plain-spoken, pleasantly idiosyncratic maiden aunt, one who has traveled, observed, considered and savored, for the most part alone. Thus some of her best poems are about places—Paris, Brazil, Nova Scotia, Maryland—which metamorphose easily into states of mind or parables without ever losing their intense particularity. Her description in *The Bight* is so precise with detail ("Pelicans crash . . . like pickaxes" into water "the color of the gas flame turned low as possible") that its sudden revelation as a metaphor for her personal condition at that instant of time is unexpected and hugely satisfying. The words with which the poem ends, incidentally, comprise a fair statement of Miss Bishop's view of life:

> All the untidy activity continues,
> awful but cheerful.

Plainly, there are limits to what a poet with this approach is likely to achieve, or attempt. Her translation of a superb poem called *The Table* by the contemporary Brazilian writer Carlos Drummond de Andrade, included in this book, accidentally emphasizes that fact. Drummond de Andrade's poem, a swashbuckling, wholly *involved* account of a heroic family dinner, makes Miss Bishop's *observations*, keen though they always are, look slightly bloodless by contrast.

But this too is relative. Given such a delightful and satisfying collection, we should be graceless to complain about shortcomings.

by Charles Elliott



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Improving highway ambulance service is a primary goal of the National Highway Safety Bureau's sixteen-step safety plan. The plan provides each state with a blueprint for improvement.

It calls for better radio communications between ambulances, police and hospitals.

It sets requirements for ambulance vehicles and the equipment they must carry. Like splints, padded boards, oxygen masks in various sizes, resuscitation units, simple suction apparatus, an adequate variety of bandages and gauze pads, and pillows. And more.

It establishes training and licensing requirements for emergency service personnel.

And it suggests that helicopters be used to improve emergency medical transport service in some areas.

We at State Farm stand strongly behind all sixteen recommendations of the National Highway Safety Bureau. One of which is this effort to improve our nation's ambulance services.

We urge you to support the National Highway Safety Bureau, too.

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LETTERS TO THE EDITORS

THE OIL SLICK

Sirs:

Your article "Iridescent Gift of Death" (June 13) should frighten all men as much as the news of Hiroshima. The world itself is being threatened.

Terrence Kester

Mineola, N.Y.

Sirs:

I can vouch for both the accuracy and perceptiveness of your article because I was with your reporter, David Snell, when he visited San Miguel Island.

Paul Veblen
Executive Editor
Santa Barbara News Press
Santa Barbara, Calif.

Sirs:

Good God, first we club their young to death, then we coat them in oil and pollute their water. What does man have against seals?

Julie R. Miller

San Jose, Calif.

Sirs:

My report on San Miguel noted during a visit May 13 has been submitted to *Defenders of Wildlife*, a conservation organization. It was completed a month before I read Snell's article. Although his survey covered a far greater area of the oiled beach, the two reports confirm and corroborate each other.

Ian I. McMillan

Shandon, Calif.

Sirs:

Congratulations on David Snell's accurate, eloquent article detailing oil damage to island, seals and shoreline.

Kenneth Millar

Santa Barbara, Calif.

▶ *Mr. Millar is better known as mystery writer Ross Macdonald.*—ED.

Sirs:

The lesson is obvious: since seals do not vote, do not send representatives to Washington, they cannot expect mercy from our plundering society.

Louise Byroade

Geneseo, Ill.

Sirs:

When the members of the presidential scientific panel go to their just reward may they know that the fire there is fueled by Santa Barbara crude oil.

Mr. and Mrs. Ben Minton

San Lorenzo, Calif.

Sirs:

The uniqueness of Santa Barbara is newsworthy, but the presentation unfairly condemns oilmen who strive to improve man's total environment.

John Woncik

Tulsa, Okla.

THE SECOND GENESIS

Sirs:

In reference to your article ("The Second Genesis," June 13), it may be of interest to you that, as a member of the American Mensa Society, I have been working to set up a program of high-I.Q. sperm-donor volunteers. I recognize that it takes 25 years to produce a trained brain and, with the rapidly changing requirements for more and more people capable of thinking about and operating complex machinery, the time to start doing something about it is *now*.

Kenneth D. Thomson

Staten Island, N.Y.

Sirs:

As in *Dr. Faustus*, the ultimate sin is the desire for too much knowledge. By the manipulation of life, we have sealed our doom more surely than by anything else, including the atom.

Mrs. Glenn Dorcas

Waverly, Kan.

Sirs:

A carefully controlled program of artificial insemination has all but eliminated defective calves at a nearby dairy. Are human beings not as important as hogs and cattle?

M. G. Marsh

Dothan, Ala.

Sirs:

I foresee a nation as wicked as Sodom, and as sure of destruction.

Florence C. Kidder

Berea, Ohio

BURN, BURSAR, BURN

Sirs:

Amen! (Andrew Rooney's "Burn, Bursar, Burn," June 13.)

After four years and approximately $15,000, they didn't even spell our son's name right on his diploma.

Jeanne Padberg

Oklahoma City, Okla.

Sirs:

While I discern the pathos of a father's concern about his children's quality of education, may I say that in my school teachers do show up for classes. In most cases, this is unfortunate.

Susan Weinberger

Brooklyn, N.Y.

REVIEW

Sirs:

I read Mr. Stefan Kanfer's review of Tennessee Williams' play *Tokyo Hotel* (June 13). It puzzles me how any critic can be so presumptuous as to declare what an artist will do in the future.

Esther Braun

New York, N.Y.

'IRIDESCENT GIFT OF DEATH:' PRO AND CON

Sirs:

Your article "Iridescent Gift of Death" (June 13) is completely contrary to the expert opinion of qualified scientists, including a group which visited San Miguel Island at the request of Senator Alan Cranston and whose findings were published in the April 25, 1969 issue of the Congressional Record.

A team headed by Dr. James L. Naviaux, director of the National Wildlife Health Foundation, and including Mr. Mel Morse, president of the Humane Society of the U.S., Dr. John Simpson, a veterinarian specializing in marine mammals, and Vern Appling, chief ranger for the Channel Islands National Monument, visited the island on Wednesday, April 16.

"I was delighted with his finding that the marine mammals he inspected on San Miguel showed no signs of injury from oil pollution," Senator Cranston states in the Congressional Record.

The report by Dr. Naviaux goes on to state that the party found only one elephant seal which appeared clinically sick, and that he had many small bite wounds and an injured cornea. He was treated and released.

None of the elephant seals which had oil on their bodies showed any signs of distress, the experts attested. "No sick or dying animals were found except the one noted . . ."

The report also noted that none of the 15 or so adult dead elephant seals were fresh carcasses. In the conclusion of the report Dr. Naviaux states that "there is no evidence that any of the wildlife on San Miguel Island is showing harmful effects from the crude oil at this time."

The conclusions of this investigating party are concurred in by Dr. Simpson, who has visited San Miguel repeatedly over the past two and one half months for the express purpose of removing suffering elephant seals, if any, and treating them. He has found none requiring treatment. In addition, Dr. Simpson has conducted autopsies and ordered biopsies on all fresh carcasses found on the island. In no case have petroleum products been found in the systems of these dead elephant seals.

It is also important to note that only 150 yards of San Miguel's 34-mile coastline are affected by the oil slick. The National Park Service has sent marine biologists to the island who have confirmed these findings. The Pacific Missile Range, which administers the island for the Navy, has cooperated fully in the protection, treatment and study of marine animals there.

Philip C. Russell
Head, Public Information Division
Public Affairs Office
Department of the Navy
Point Mugu, Calif.

Sirs:

As curator of mammalogy and ornithology at the Santa Barbara Museum of Natural History, I made a survey of the pupping beaches on San Miguel Island on Monday, May 19, a week before the arrival of Life's team. I feel I can readily support your findings. A few points raised in the letter sent you by the Navy base at Point Mugu need clarification.

Item: The date of the expedition quoted in the Navy letter is April 16. This is a full month prior to my investigation. I observed the oil to be fairly fresh on May 19.

Item: Little or no mention is made of California sea lions (*Zalophus californianus*). This was the only species I found to be in serious difficulty, the species featured predominantly in the Life article. My investigation showed that there is definitely an abnormal condition in the sea lions. Aborted fetuses were in large number high in the sands and rocks. While such abortion storms are not unusual in piniped species, the reasons are exceedingly difficult to analyze, if not impossible.

I did notice, however, a major portion of the northwest pupping beach to be heavily contaminated with crude oil. My estimates of the beach area were that 200 yards in length and 75 to 100 feet wide contained heavy amounts of oil mixed with debris. In this area, I counted 28 dead, oil-soaked pups. I also examined one or two of these carcasses and found oil in the mouth.

Item: The statement attributed to Dr. Naviaux: "There is no evidence that any of the wildlife on San Miguel Island is showing harmful effects from the crude oil at this time." Note the qualifying "at this time." Again, this was a month before I was there and a month and six days prior to the Life team's visit.

Pups had been born in oiled areas. Those born above the oil were suckling on the oil-soaked mammary glands and fur of mothers that had crawled through the oil to get to their pups. Oil contamination certainly contributed to the death of some of the hundreds of sea lion pups I observed on May 19.

Item: The statement that "it is important to note that only 150 yards of San Miguel's 34-mile coastline are affected by the oil slick."

This statement must be placed in perspective. Nearly all of the shoreline is made up of precipitous rocky faces. Only the extreme west end of the island contains the sandy beaches on which the seals breed and pup. Even at Dr. Naviaux's modest 150 yards, this would be a large percentage of the breeding and pupping area.

Waldo Abbott

Santa Barbara, Calif.

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LIFE
Vol. 67, No. 1
July 4, 1969

The Moon Ground

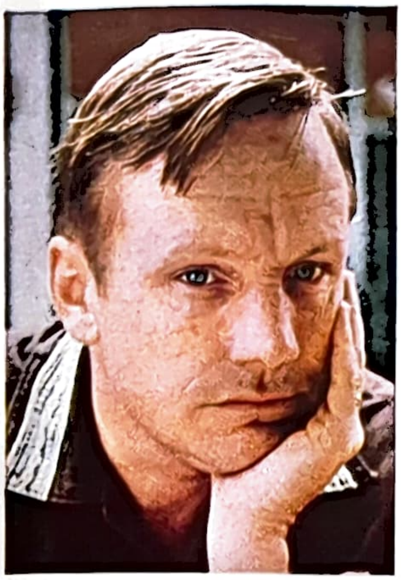
by JAMES DICKEY

You look as though
You know me, though the world we came from is striking
You in the forehead like Apollo. Buddy,
We have brought the gods. We know what it is to shine
Far off, with earth. We alone
Of all men, could take off
Our shoes and fly. One-sixth of our weight, we have gathered,
Both of us, under another one
Of us overhead. He is reading the dials he is understanding
Time, to save our lives. You and I are in earth
light and deep moon
shadow on magic ground
Of the dead new world, and we do not but we could
Leap over each other like children in the universal playground
Of stones
but we must not play
At being here: we must look
We must look for it: the stones are going to tell us
Not the why but the how of all things. Brother, your gold face flashes
On me. It is the earth. I hear your deep voice rumbling from the body
Of its huge clothes Why did we come here
It does not say, but the ground looms, and the secret
Of time is lying
Within amazing reach. It is everywhere
We walk, our glass heads shimmering with absolute heat
And cold. We leap slowly
Along it. We will take back the very stones
Of Time, and build it where we live. Or in the cloud
striped blue of home, will the secret crumble
In our hands with air? Will the moon-plague kill our children
In their beds? The Human Planet trembles in its black
Sky with what we do I can see it hanging in the god-gold only
Brother of your face. We are this world: we are
The only men. What hope is there at home
In the azure of breath, or here with the stone
Dead secret? My massive clothes bubble around me
Crackling with static and Gray's
Elegy helplessly coming
From my heart, and I say I think something
From high school I remember Now
Fades the glimmering landscape on the sight, and all the air
A solemn stillness holds. Earth glimmers
And in its air-color a solemn stillness holds
It. O brother! Earth-faced god! APOLLO! My eyes blind
With unreachable tears my breath goes all over
Me and cannot escape. We are here to do one
Thing only, and that is rock by rock to carry the moon to take it
Back. Our clothes embrace we cannot touch we cannot
Kneel. We stare into the moon
dust, the earth-blazing ground. We laugh, with the beautiful craze
Of static. We bend, we pick up stones.

Three Men Bound for the

Soon they will be the most celebrated explorers of all time

If all goes as scheduled, the incredible moment described by James Dickey on the preceding page will actually take place on the moon ground in a few weeks. The names and faces of these three men will then be celebrated throughout the world. Their Apollo 11 mission, by going to the moon and landing on its alien surface, will fulfill the remarkable national goal established eight years ago by John F. Kennedy. But the dream of the moon, of actually setting foot there, came to man long before he created nations. The dream belongs to all men, and in making it real these astronauts represent everyone on earth. On the following pages appear photographs and reports on these superbly trained and keenly motivated adventurers—cool and low-key, with no puffed-up sense of their own courage or extraordinary destiny. Here are the real men, immensely human out of their spacesuits, who will bring us back pieces of our moon.



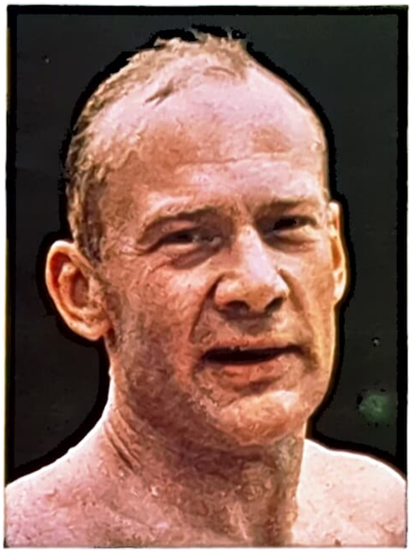
Neil Armstrong

He will command the flight of Apollo 11 and become the first man to walk on the moon. At left, a 7-year-old at his grandparents' farm near his boyhood home, Wapakoneta, Ohio, he waved from his pony.

Moon

Mike Collins

He will pilot the Apollo spacecraft, orbiting the moon while his two fellow crewmen walk there. At left, a contemplative 7-year-old, he sat in front of the family home on Governors Island, N.Y.



Buzz Aldrin

He will pilot the lunar module to a landing on the moon and become the second man to set foot there. Below, a chubby, cheerful 5-year-old from Montclair, N.J., he sat firmly astride a Shetland pony.

Neil Armstrong refuses to 'waste any heartbeats'

When he was in high school in Wapakoneta, Ohio, Neil Armstrong (second from left) played baritone horn in the Mississippi Moonshiners, a jazz combo that he formed. On leave from Pensacola, where the Navy was teaching him to fly, Neil greeted his grandmother (above) in front of the family home.

Wearing his fishing hat, Armstro lights up. Not a frequent smok he says, "I smoke one cigar month, but sometimes I forget to

by DORA JANE HAMBLIN

When Neil Armstrong was a small boy, he had a recurrent dream: he could, by holding his breath, hover over the ground. Nothing much ever happened—he neither flew nor fell, just hovered, and the whole thing must have been frustrating to a child as captivated by the idea of flight as Armstrong was even then. Today, he remembers the dream with a characteristic flickering smile. "I tried to do it later, when I was awake. It didn't work."

From age 9 Neil Armstrong was an aircraft nut, loving all types of aircraft with a single-mindedness bordering on obsession. When he joined the elite group of astronauts in the autumn of 1962 he did so almost reluctantly. For seven years as a civilian pilot at Edwards Air Force Base, Calif., he had been testflying the most exotic aircraft the U.S. had to offer, and working as engineer and researcher far out on the fringes of flight.

"In those days it wasn't a question of 'Do you want to be an astronaut or do you want to sweep streets?' " he says. "A whole array of approaches to space was in the works. We were doing some exciting, way-out things in which we were more than just pilots. We were engineers and developers using airplanes merely as tools, the way an astronomer uses a telescope as a tool. We considered the space flight task group," he concludes with more diffidence than arrogance, "as babes in the woods."

Not until after John Glenn had orbited the earth and "space programs had become well-defined, the lunar misson a definite reality," did he come to NASA as an tronaut. He entered the progr as a senior NASA research pilo civilian, at the highest salary e offered an astronaut. He is still something over $27,000, the hig est-paid astronaut and as such occasionally resented by some his colleagues who are still on m itary discipline and military p He is probably the most inte of the astronauts, and the m enigmatic.

"If you tell Neil that blac white, he may agree with you j to avoid argument," says an quaintance. "No, most likely won't say anything at all," s someone else. "He'll smile at yo and you'll think he is agree Later on you'll remember that didn't say a word."

"Silence," agrees his wife Ja

who can be pretty enigmatic herself, "is a Neil Armstrong answer. The word 'no' is an argument."

In any case, aircraft—not people—are the passion of Armstrong's life. When he speaks of them, or of aerodynamic principles, he is eloquent. When the subject changes, he tends toward silence which is not so much icy as controlled. Neil Armstrong finds people far less efficient than aircraft and their performance generally short of their capacity.

"The single thing which makes any man happiest is the realization that he has worked up to the limits of his ability, his capacity," he says. "It's all the better, of course, if this work has made a contribution to knowledge, or toward moving the human race a little farther forward."

He grew up in middle-America during the Depression, steered by a set of stern and stubborn values: work hard, smile, save your money, count your blessings (things could be worse) and pray a lot (things could be better). Also: learning is the salvation of the human race, and sloth by far its greatest peril.

One of the words Neil uses often in conversation is "luxury," but he doesn't mean either physical possessions or life style. To him "luxury" is time, or choice. "In your business you're probably capable of thinking of a couple of projects at once," he will say. "That is a luxury I'd like to afford." Or, "We'll be too busy to have the luxury of monitoring all the study sessions."

Right now he's busy brooding over the lack of luxury in organizing every moment of the few hours he'll spend on the moon. "There are two viewpoints: whether we should concentrate on what's best for the results of *this* expedition, or whether it's best to prepare so that later expeditions may be even more fruitful," he says. "It's a matter of balancing two objectives and coming up with a procedure that fulfills both within the operational restrictions." He is working so hard at this that he comes home white with fatigue, eats a hurried supper crouched over the latest batch of NASA reports, and rushes back to work in the morning with only coffee for breakfast.

Neil was the oldest of three children of Stephen and Viola Armstrong. His tall, good-looking, image-conscious father worked as an auditor for the state of Ohio and moved his family around about once a year from one county seat to another as he audited the books. His mother was musical, somewhat literary, self-effacing and every inch "a *good* woman." The children were expected to help at home, earn money at odd jobs and be careful to yearn only for the things they could afford.

By the time Neil was 14 he had passed through an extensive model-airplane-building stage and the family had come to rest in Wapakoneta, Ohio, pop. 7,000. (Wapakoneta's present pride in Neil is almost unbounded. There have been two Neil Armstrong Days already and a third one is planned for this fall. A street and an airport are named after him. His photograph is displayed everywhere.)

In 1944, Neil took a 40-cents-an-hour job sweeping out and hoisting cartons at Rhine and Brading's pharmacy before and after school. Every now and again he would ask his boss Dick Brading for a couple of hours off. This didn't happen often, because what he yearned for cost $9 an hour, and it took a while to accumulate that sum. Brading always gave him the time, and Neil rode off on his bicycle three miles out on what is still called "the old brewery road" to the Wapak Flying Service. There he would hand over his fistful of money to Charles Finkenbine, and then all but sprint to one of the light planes Finkenbine used for flying instruction.

On his 16th birthday, Aug. 5, 1946, Neil Alden Armstrong got his pilot's license. He looked about 12 years old and didn't yet have an automobile driver's license.

Depression times were long over by 1947, but the Armstrongs still feared that it would take the intervention of divine providence to send the kids to college. It is therefore no wonder that on the day when Neil ran home to tell his mother he had won a Navy scholarship that good church-going lady dropped a quart jar of preserved raspberries on her right foot and broke her big toe.

Neil went to Purdue University to study aeronautical engineering for two years, then went to Pensacola for Navy flight training. By the time he won his wings the Korean War was on, and he was sent to fly Panther jets from the deck of the carrier *Essex*. He was 21 years old. In 78 combat missions he became known as a very hot pilot and won three Air Medals. He once coaxed a badly crip-

CONTINUED

pled jet back to the deck of the *Essex* and in an even closer call was shot down—behind enemy lines—and rescued within a day. Since then, he has survived several near misses in experimental aircraft, including the X-15; a middle-of-the-night fire in his Texas home; a hair-raising flight on Gemini 8—the only manned space flight to date which had to be brought home early because of an emergency; and the crash a year ago of a Lunar Landing Research Vehicle in which he was training at Ellington AFB, Texas.

Obviously, after that string of cliff-hangers, anyone willing to send this man to the moon must consider that a) he is one of the best pilots in the world or that b) everything that is going to happen to him has already happened. Armstrong himself denies any particular courage or any fear of the moon-landing mission. "I have been in relatively high-risk businesses all of my adult life," he says. "Few of the others, however, had the possibility of direct gains in knowledge which this one has. I have confidence in the equipment, the planning, the training. I suspect that on a risk-gain ratio, this project would compare very, very favorably with those to which I've been accustomed in the past 20 years."

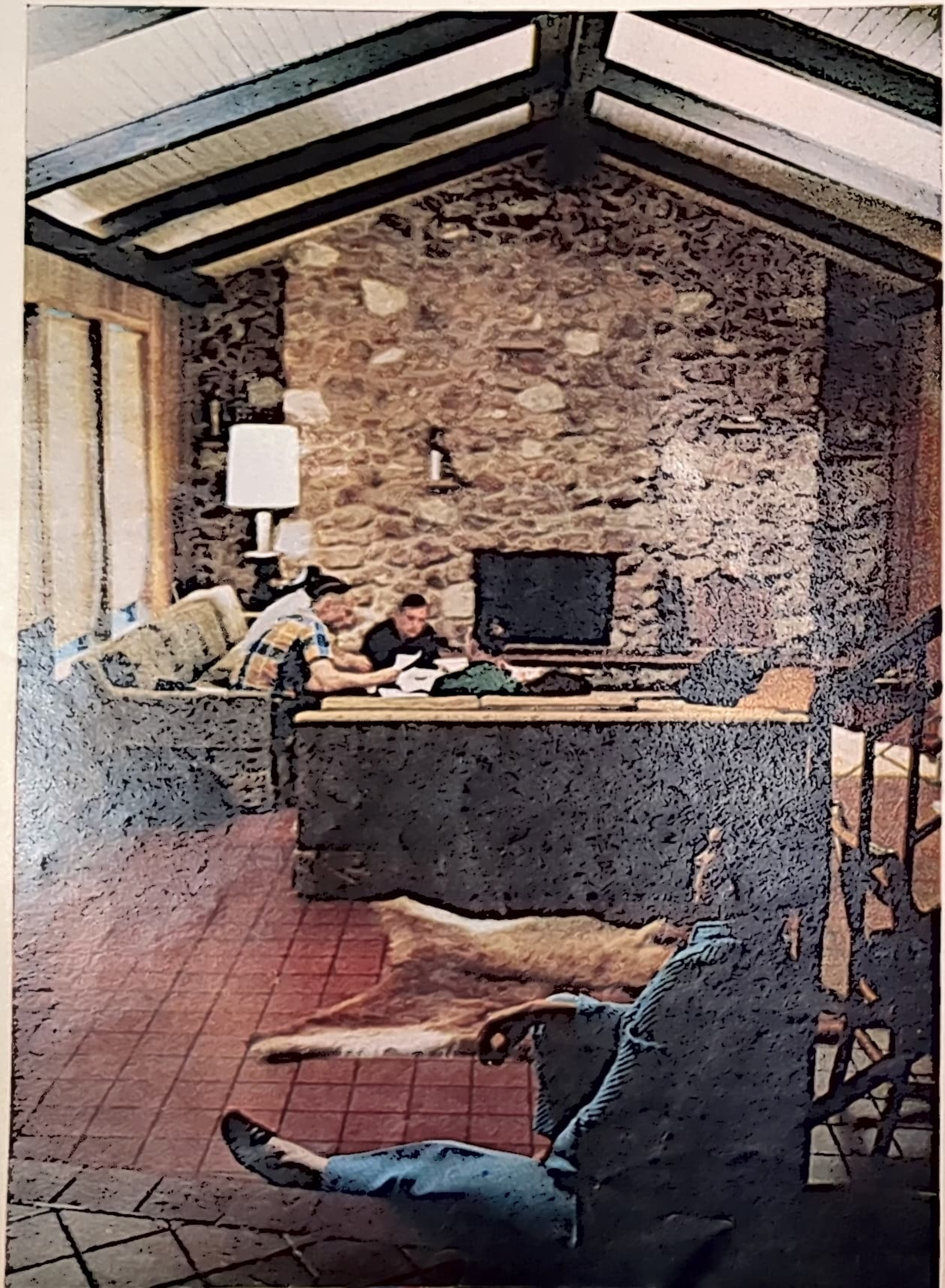
Neil and Jan Armstrong met while both were students at Purdue, after Neil came home from Korea. Janet Shearon knew quite a lot about airplanes because her father, a physician in Wilmette, Ill., had owned one for flying back and forth to the family summer home in Wisconsin. But the initial bond between Neil and Jan wasn't planes. They got acquainted by running into each other around the campus in the chilly dawn. Neil had a job delivering the campus newspaper and Janet, a home economics student with a passion for swimming, had a lot of 6 a.m. lab courses. Each admired the other's industry. After three years of admiration, Neil finally asked her for a date.

"He is not," says Jan, "one to rush into anything." Neither is he one to abandon a project after he has started it. Having been a Boy Scout most of his life, he finally finished the requirements to make Eagle during his freshman year at Purdue. He finally got around to marrying Janet Shearon in January 1956.

One of their first homes was a primitive summer cabin 5,000 feet up in the mountains and "50 miles without a stoplight" from Edwards Air Force Base, where Neil had signed on as a research pilot. It was so lacking in modern conveniences that Jan bathed their first son Ricky in a plastic bathtub in the backyard after the sun had heated the water. But the privacy and the view were magnificent, and Neil could flash through the sky right over their house, waggling at his wife the wings of some of the most exciting airplanes of the era. At Edwards, he also learned to fly gliders. The special exhilaration of silent, powerless flight has remained one of his greatest pleasures. Neil never cared much for team sports. Among the astronauts, for whom physical fitness is almost a fetish, he is an anomaly. He neither jogs, does push-ups nor plays handball. "I believe," he says mildly, "that every human being has a finite number of heartbeats available to him, and I don't intend to waste any of mine running around doing exercises."

Neil's dry humor, of which he has a considerable fund, often tends to slip by unnoticed. Consequently, almost nobody heard him quietly remark, during a heated cocktail-party discussion of education in Texas, that "My son is only in kindergarten, and already he's had two years of Texas history."

As family man, Armstrong is low key. He both grants and takes a high degree of you-live-your-life-and-I'll-live-mine. When he dashes off to Cape Kennedy for training he often neglects to tell Janet where he'll be staying. He will telephone her when and if he can. When he comes home at mealtime and finds Janet is off teaching swimming classes, he reads the note she has left on the refrigerator door and then equably fishes dinner out of the oven where she has left it and feeds himself and



On a Sunday afternoon Jan Armstrong sits isolated in her Houston living room, while husband Neil and his crew rehearse the mission with their training coordinator.

With sons Mark, 6, and Ricky, 12, Neil fishes in Taylor Bayou near their home. Neil's bright red cap is one of many: "Different colors work better on different days."

the two boys. When they entertain they do it at home, with Neil helping in the kitchen. From one of his childhood jobs in a bakery—a job he got because he was small enough to be put bodily into the mixing vats to clean them at night—he acquired an expert touch as a dough mixer. He now can make a mean pizza. He is capable of cold, tight-lipped rage, triggered most often by what he considers either dishonesty or subterfuge. These defects he apparently finds scarce in his own family, however, since his parents and his wife all consider him "a very easy man to live with."

He enjoys reading, although "I've had to stop lately, because I am incapable of putting a book down once I've started it, and that's a luxury I can't afford for the time being." He loves music. He "scrimped and saved" to buy himself a baritone horn back in Wapakoneta, and he once permitted himself a deviation from his self-set working schedule by playing for one giddy high school year in a four-boy combo called the Mississippi Moonshiners. He also learned to play the piano creditably, and he and Jan occasionally sit side by side on the family piano bench attempting impromptu duets which seldom survive the first 20 bars. It is both a joy and a relief to visitors to see the noncommittal Armstrongs engaged in the totally human act of breaking each other up laughing in mid-duet.

At times like these the optimist may begin to think that he has found a pattern to the Neil Armstrong enigma. He is a folk hero who obviously has nine lives, all but one of which he has offered, repeatedly and publicly, to his country. But the last one is purely his own, the one he was privately enjoying while offering up the rest. That is the life in which he doodles aircraft of the future, the life he lived in a lonely California cabin, the life in which he plays the piano and flies gliders, flying for once in a silence and solitude in which he is both pawn and master of the elements.

The analysis is put to the subject: "You know what you really are? You're a screaming nonconformist, and a loner!"

"Oh, I don't know," says Neil, letting that boyish smile creep for once clear up into his eyes. "It's just that it's nice to get away from the office once in a while, you know . . . ?" ◄

Buzz Aldrin has 'the best scientific mind we have sent into space'

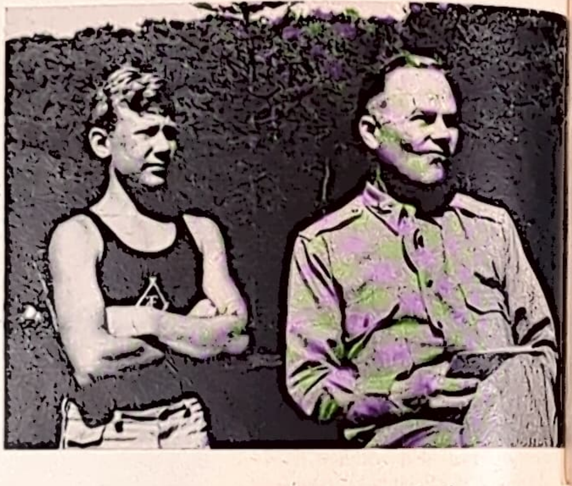
by GENE FARMER

Buzz Aldrin is a perfectionist and NASA workmen who have to do his bidding at the Manned Spacecraft Center find him a demanding taskmaster. A good many people inside the astronaut community think, with somewhat less justice, that Aldrin is a square as well. "If Buzz had his way," said one of the wives, "the code names for the spacecraft on Apollo 11 would be Alfa and Bravo."

He has practically no hair and, on the testimony of his wife, is a strange mix—"humility and magnificent confidence bordering on conceit." He is without much tolerance for inconsequential talk, but is happy to wrap his fist around a glass of bourbon and branch and talk until the small hours about the subject that interests him, which is his trade. It is then that he chews at the left side of his lower lip as he rambles on about rendezvous and docking in space, his eyes gleaming with the intensity of small volcanoes as he addresses himself to the problems of "ecliptic orbit"—as if everyone understood as much about that as he does.

One eminent geologist flatly calls Aldrin "the best scientific mind we have sent into space." Says Ted Guillory, a flight plan writer at the Houston Manned Spacecraft Center, "Boy, he's really something. He carried a slide rule for his Gemini flight on the rendezvous and I sometimes think he could correct a computer. I can remember hearing him say things like, 'If the computer says I'm 20 feet out of plane I'll believe 10 of that, but not all 20.' He's one of the few people who can figure out all these rendezvous things in his head."

"If Buzz were a trash man and collected trash," Joan Aldrin says, "he would be the *best* trash collector in the United States." Buzz was the first man to join the astronauts with a doctorate (M.I.T., 1963), having written a thesis which, NASA's Chris Kraft has acknowledged, contributed a great deal to the success of the space dockings achieved in the Gemini program. When he tested his theories successfully in the last Gemini flight in November 1966 (simultaneously becoming the first astronaut to beat the fatigue problem in a space walk—by learning to pace himself properly), he had the satisfaction of knowing that he personally had added significantly to the space program.



As an 8-year-old (above), Buzz Aldrin lolled at the family summer place in New Jersey. At right, his father, in the Army Air Corps, visited camp in Maine, where Buzz ran in a track meet. Now Buzz pole-vaults (far right) in his backyard.

"Challenge" is a word Buzz Aldrin uses frequently. "What is challenge?" he asked once. "What determines excellence? In grade school it's the marks that you get, what you do on the athletic field. At West Point the name of the game is, 'Do what people tell you to do, keep your nose clean and work out your academic progress.' I fitted into that pretty well. I'm a sort of mechanical man—or I was."

This is a judgment with which most of his fellow astronauts would agree. He is an easy man to appreciate, but not an easy man to know To one of his colleagues he "has enormous ability, enormous talent—but he is very much a loner."

Buzz was born in Montclair, N.J., Jan. 20, 1930, about five months after his father, who left the Army Air Corps in 1928 to work for Standard Oil of New Jersey, had bought a comfortably large house there. The elder Aldrin was a distinguished aviator in the 1920s and 1930s (he still holds a pilot's license at the age of 73) and at one time was a close associate of Orville Wright. He was also a student and friend of the American rocket pioneer Robert Goddard; he introduced Charles A. Lindbergh to Goddard in 1929 and is one of the few men who still refer to General Lindbergh by his old nickname "Slim."

Buzz's father was away a lot, flying all over the U.S. and Europe to promote commercial aviation (only the oil companies had money for that in those days), but the income was good and steady; none of the Aldrins remembers the Depression as a time of privation. There was enough money for nurse and a cook, who indulged Buzz in certain *outré* tastes he had developed in food—sandwiches of peanut butter, sliced bananas and a topping of powdered chocolate; whole cans of tuna eaten straight out of the can; packages of Jell-O consumed dry. "I don't know how he got his mouth apart," says his sister, Mrs. Fay Ann Po of Cincinnati.

His other sister, Madeline, now Mrs. Charles P. W. Crowell Jr. Tulsa, Okla., remembers that through grade school Buzz more inclined to buckle down neighborhood football games to his homework—his report were mostly C's and D's.

CONTIN

ALDRIN

CONTINUED

All that changed just before he was due to enter high school. Not surprisingly, considering his father's example, Buzz decided that he wanted to be an aviator, which meant trying for an appointment to West Point or Annapolis. At a conference with his parents and the school counselors it was made frighteningly clear to him that unless his grades improved he would never see the inside of either academy except as a custodian or a tourist. Buzz got the message, and after that it was all A's and B's—mostly A's. He made it look almost too easy. Fay Ann was a year ahead of him in high school but, she says, "If I had a math problem or a science problem I'd go in and work it out with him even though he hadn't taken the subject yet. He seemed to be able to explain it to me. I marvel today at how well he can explain the intricacies of what he is doing and make you understand and not feel stupid."

He still found a football a challenge, and played center on the Montclair High School team that won the New Jersey state championship in 1946, compensating for his small size with what French generals call *cran* and football coaches call "desire." He had learned how to make friends, but even then was beginning to draw apart; he chose to walk to and from school (a mile and a half each way) with Fay Ann. This, Fay Ann thinks, was "so that he didn't have to get involved with finding other people to walk with. We didn't talk an awful lot."

At the end of his plebe year at West Point, Buzz was No. 1 in his class. In 1951 he was graduated as No. 3. He was also a 13-foot 9-inch pole vaulter—with a bamboo pole, before fiber-glass poles started whiplashing 13-foot vaulters to suborbital heights.

For a West Point graduate in 1951, a diploma was a ticket to Korea—in Buzz's case, by way of Bryan, Texas, where he spent a year getting his Air Force wings. Just before going to Korea, at a dinner party in New Jersey, he met Joan Archer, a striking blonde who owned a master's degree in theater arts and was otherwise unattached. But, says Joan, "Nothing happened, no spark." At the time, Buzz was writing to another girl. When he came back from Korea a year later (66 fighter missions, two MiGs destroyed and one damaged, the D.F.C. and other decorations) he again got in touch with Joan. She was soon wearing Buzz's West Point pin and getting thoroughly bored, since she was now off limits to other dates and Buzz was out in Nevada as an Air Force instructor courting her by mail.

"Buzz wouldn't make the move," says Joan. She persuaded her father to take his vacation in Las Vegas for two weeks, and the night before they were to leave Buzz proposed. "I had just about given up," says Joan. "I sensed that," says Buzz. When they got married it was only the fifth time they had been out together.

Buzz shortly found himself in Germany, flying F-100s, surrounded by pilots who were either as hot as he or claimed to be, and increasingly convinced that what he really needed was more formal education. What he was really doing was looking for a new "challenge." By the time he and Joan were flattened simultaneously by hepatitis for six months in 1959 ("from drinking dirty wine in Italy," according to Joan), Buzz had set his sights on the U.S. space program. He got the Air Force to send him to M.I.T. to get a doctorate, bypassing the master's degree. While there he applied for the 1962 class of astronauts and was turned down. Test pilot experience was then required and Buzz did not have it. "I tried for a waiver," he says. "I knew darned well I wouldn't get it, but I wanted the application in the record." He was disappointed nonetheless and even considered leaving M.I.T. to get test pilot experience. Finally he decided, "Here I am. I might as well get the best out of it." So he stayed in Cambridge. "I had some original ideas," he says without false pride or false modesty, "about piloting problems and rendezvous. That thinking fitted beautifully with what they needed for Gemini."

Buzz has had only one space flight—Gemini 12. Characteristically he was about the only person dissatisfied with the results—he would have liked to have pressed extravehicular activity (the "space walk") to new limits, but in the last Gemini mission nobody wanted an extra risk. Then, in January 1967, came the pad fire in which three men died, one of them Buzz's close friend Ed White, and the Apollo program was set back almost two years. For 21 months nobody flew. Joan Aldrin began to sense that something big was up in January this year when Buzz began acting more withdrawn than usual. When she finally realized that he had been selected for the moon landing crew, she hardly knew whether to cheer or cry. Waiting for the formal announcement was a time "of walking on eggs, normalcy tinged with hysteria. I wished Buzz were a carpenter, a truck driver, a scientist, anything but what he is. Now I understand how Susan Borman felt—wanting to run and hide. I want him to do what he wants but I don't want him to . . ."

No astronaut's wife ever seems able to complete that sentence satisfactorily. For Joan Aldrin, the Apollo 11 flight will be a time of housecleaning—get the rugs cleaned, wash the windows, paint the walls. It will be a way to keep sane. During the months preceding the flight Buzz had not been home much—any more than his father had been home much when Buzz was the age of his 11-year-old son Andrew. During the Apollo 9 mission in March, Buzz called home every night from Cape Kennedy to check on how Andrew's school science project was going, perhaps remembering something missing in his own boyhood. Last month, Joan Aldrin took the three children (Andrew; Janice, nearly 12; and Michael, 13) to the elder Aldrin's beach house in New Jersey for a quiet vacation while Buzz was at the Cape for his final weeks of training. It was her way of staying out of the way. She was wondering if Buzz would be the same man when he got back from the moon. She had wondered the same thing when Buzz flew Gemini 12. She had felt then that "our marriage wouldn't be the same, that it would be so much more magical and meaningful and magnificent because he'd done

At the new Astroworld amusement park in Houston, Buzz and his youngest son Andy, 11, take a whirl on the "Black Dragon." At home (right), Buzz kisses his wife Joan.

this wonderful thing." Then, perhaps six months later, she realized that their marriage was exactly what it had been. "At first I was disappointed," she says, "and then it was comforting to think that it hadn't changed him. I really do believe that after all this is over, and if it is a lunar landing, that he will be the same person. He's not the same person I married, but I don't believe that I am the same person either."

What kind of person was he—or is he? What kind of person is any man who risks a death no man has ever died? Why does he do it? For money? (There isn't that much money.) For glory? For old-fashioned patriotism? There is some of that in all these men. But as Aldrin says, there is something else, a common denominator, perhaps, for all 50 astronauts:

"When you try to answer the question of motivation, you have to ask: 'What type of people are we talking about?' In our business we're talking about airplane pilots, fighter pilots. If you are a fighter pilot, you want to get hold of the hottest thing you can. And having flown that, you ask yourself: 'What else can I fly? What else is available?'

"You come down to the ultimate, the space program. It's *there*. Some people don't think they have a chance and don't bother to try. Others say, 'I'll accept that challenge.' Some make it and some don't. But there's a treadmill going and if you make it, you're on it. You have some control over it by your own performance. Fate determines a lot of where you fit into the puzzle. But why do you do anything? Because you were selected to do it." ◀

Collins has cool to cope with space and the Easter bunny

by **DAVID NEVIN**

Mike Collins is a pleasant man who smiles readily and is highly popular with his fellows. He is pragmatic and fatalistic in a way that goes more to attitude and the control of worry than to philosophy, but he also is intelligent and a good deal more subtle and many-layered than he cares to admit. He has immense faith in himself and his capacity to perform under pressure. What worries him more than the dangers of traveling in space are the tiny, insidious cells of cancer, for instance, because cancer is irrational and against it he feels helpless, while the menace of space is ordered, logical, and allows him to rely on himself, which is the stance in which he is most comfortable.

At 38, Collins is slender, limber, deceptively slight, the handball champion of the astronauts. Early last year, his game went off. "My legs felt peculiar, as if they didn't belong 100% to me. I'd heard prizefighters talk about their legs going and I thought, well, instant old age." But the condition progressed. Parts of his legs were soon without feeling. His reflexes were failing. Sometimes he fell down.

The doctors found a bone spur and a loose disk in his neck that were pressing on his spinal cord. There are two operations for this, both serious. One relieves the problem. The other, more dangerous and complex, cures if it succeeds. Collins chose the latter and the operation was successful. He recovered fully and returned to flying status. He discusses the episode today with utter matter-of-factness and no hint of emotion. And yet this was a devastating turn of events. It cost him a position on Apollo 8, the first flight around the moon. His whole future as a space pilot and an Air Force officer had been in the balance. Surely there was distress and trauma?

"Well, it seems to me that trauma comes from having to make decisions that are very nearly 50-50. You know, 50.1 against 49.9. Those are the things that really bug people. But here there was no doubt. I had this thing creeping up the left side of my body, getting worse and worse, and the salient fact was that it had to be stopped and the operation was the way to stop it. All the other things—what failure could mean to my career and so on—were only background noise. I had no choice—I had the condition, surgery was the only answer and—*voilà*—it would be done, and one hoped it would work and if it didn't, it didn't, but I still had no alternatives."

But isn't there a sense of horror in this rude invasion of the body that always has served so well?

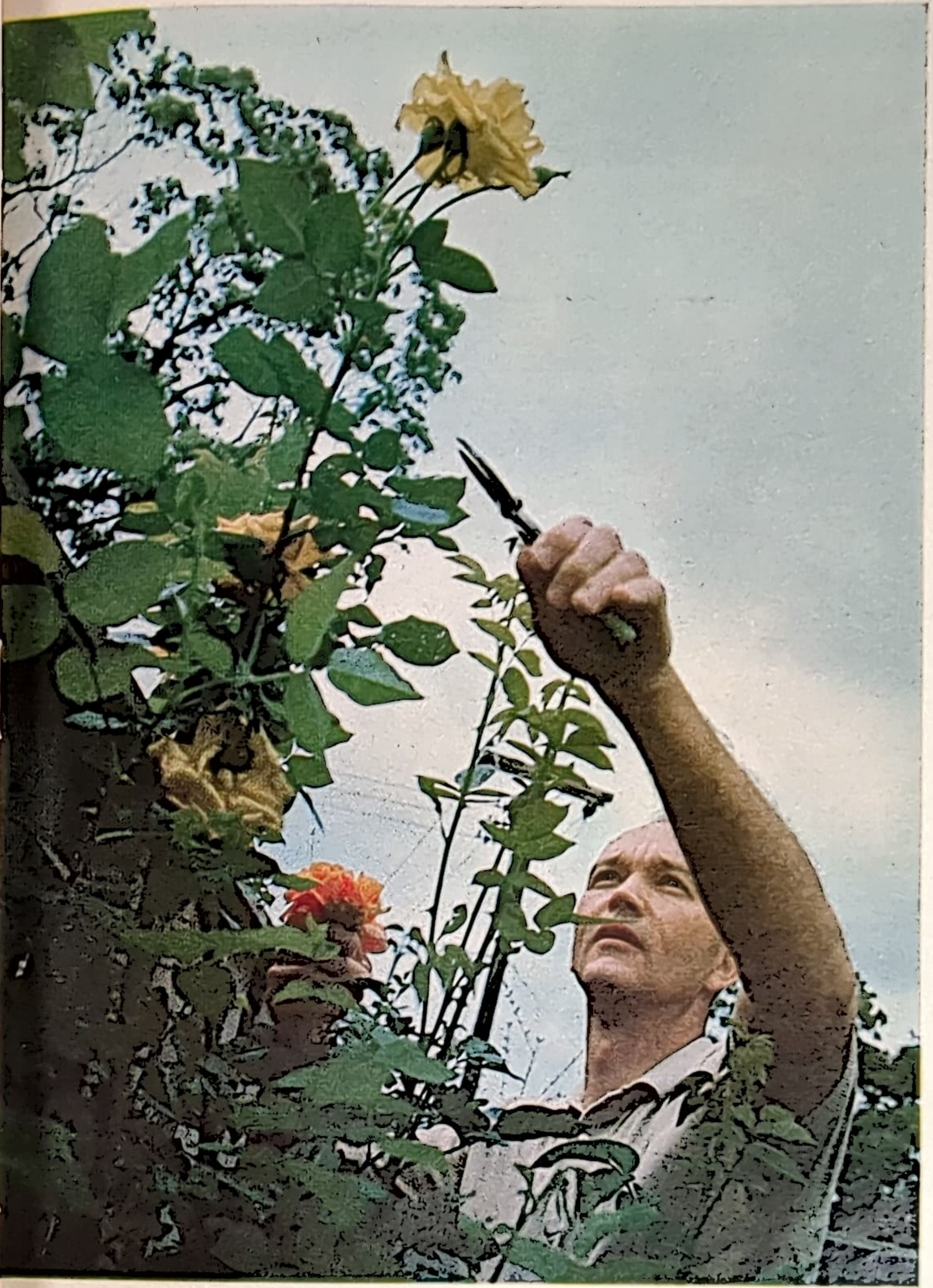
"No, not really. If trauma comes from decisions that are nearly 50-50, I think horror comes from things that are not clearly understood. You can get a cancer and they remove part of your liver and then later on you find it in the lymph stream and then it shows up in some other horrible place—that sort of thing is very insidious, mysterious, a cult of evil, you know? In my case, pressure on the spinal cord—that was a relatively clean thing. The mechanism was well understood. Things that you understand fully are not really frightening."

Is he an optimist then—which, after all, would be comforting in the dark of space?

"Not a perennial optimist, anyway. I think I'm more the fatalist—what's written is written, and I don't know what it is. I'm not always convinced that everything is going to work out well. On the other hand, there's nothing wrong in acting as if things *will* work out. I mean, if I tell my wife I believe in the Easter bunny—well, why not? Either he exists or he doesn't, and I choose to believe. I think that is much more pleasant. But if you really cornered me, I'd have to admit reluctantly that there is no Easter bunny."

Collins is of a military family and is himself an Air Force lieutenant colonel, though he has little of the military manner. He was born in Rome, where his father, Major General James L. Collins, was then military attaché to the U.S. Embassy. His uncle, General J. Lawton "Lightning Joe" Collins, was a famous World War II division commander and eventually Army chief of staff, and his older brother now is a brigadier. Collins grew up on military posts and as a result there is no place he thinks of as home. The place he remembers most happily is Puerto Rico, where his father was commanding in the days before World War II and they lived in a building some 400 years old which the Spanish had built with stone walls thick enough to withstand cannon fire. It was an immense structure with

At West Point, Mike Collins (above, front row right) played end on his intramural football team. At 10 (top picture) he posed on the porch of the family's San Juan villa with his father, then an Army major general stationed in Puerto Rico. In the garden of his Houston home (right), he tends roses.



gunports and tunnels that made extraordinary play places for a 10-year-old. There was a strip of beach and when a shark appeared the guard would run down and hose it with a tommy gun. A high stone wall surrounded the military area and a poor, waterfront section of town had been built against it. "A house of, well, ill repute, you know, was right there." Collins remembers it well. "They did a thriving business, so I used to sit up on the wall and watch everyone come and go and talk to the girls, and I can remember they used to—oh, I was a rat fink—they used to toss me money to get me to come down and visit them but I never would. I was scared to death to."

He went to West Point, attracted, he is fond of saying, by the fact that the education was both excellent and free, and when he graduated in 1952, elected to serve in the Air Force. The Air Force trained him in fighters, and from the beginning he loved flight and the great machines that boomed off the earth and became alive and supple and responsive to his touch. His wife remembers meeting him for the first time on a base in France with a group of young fighter pilots, all of whom were excited and confident. Her name was Patricia Finnegan and she came from Boston and was employed by the Air Force. She would sit in a room with these brash young men, often enjoying a mood of private irony. She would see an expression cross Collins' face that matched her mood and she decided then that he was special.

In 1956, four years after graduation, Collins could have resigned from the Air Force, and for a time thought seriously about doing so. His intense commitment, his wife remembers, was not to the military but to the matter of flight itself, and Collins was thinking about test piloting, which is a logical extension of flying but not of military flying. Eventually, he made the Air Force test pilot school at Edwards AFB in the Mojave Desert and flew the X-15 and other far-out aircraft. Then, naturally, he turned to space.

I like fighter pilots. They're independent, they say what they mean, they prove who they are by what they do. They have nice parties and they let their ids hang out. They're good people. But fighter pilots can afford to be irresponsible and impetuous and test pilots can't. Test pilots have to be older, smarter, steadier or they'll make a wrong judgment on an airplane and someone will kill himself later. The old thing about, you know, white scarf trailing, put her in a power dive and see if the wings come off—it's not true. The test pilot has to be more of an engineer, studying charts and graphs for the airplane's limits.

"And space flight is an extension of that. Our training is more thorough, more elaborate. People think we're baked in heat chambers and whirled in centrifuges until our eyeballs fall out, and there is a little of that, but essentially we are learning an incredibly complex array of machines—all the nuts and bolts and wires—and learning what to do if some of it doesn't work as advertised. We go through the intended missions tiny tedious bit by bit to make sure that we understand it and that the equipment is right and what its malfunction modes are and what our alternate plans are."

So he came finally to the exploration of space. Yet Collins really is not quite completely the various things he seems to be. He loves flying, but he could quit tomorrow. He is a trained engineer, but he does not love machines as such. He knows a great deal about wines and he reads good books and raises roses in the backyard. He is one of those men who take particular pleasure in the way a flower grows or a cat walks or his little boy looks when he wants something. When he comes home, he is so *here*, his wife says, so completely relaxed and easy, fun to be around—light, happy, bright in the late

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afternoon when she is tired and the day has been long and it is time for a change of authority with the children. His wife likes to talk—needs to talk—and Collins listens to her fully and thoughtfully, often not agreeing, sometimes demanding that she rethink her point, but always with respect, and she says simply, "I am lucky." He is not the mechanical man or the pilot who is only alive in the air. He has not been, until now, a seeker of the unknown.

Still, Collins finds it hard to articulate his reasons for going into space. "I think man has always gone where he could, he has always been an explorer. There's a fascination in exploring and thrusting out to new places, but I can't say there is anything special about me—that I'm a natural explorer or I've always been bent in this direction—because it isn't true. I'll be a good explorer, but so would other people. I really think the key is that man has always gone where he could and he must continue. He would lose something terribly important by having that option and not taking it."

Collins' nature, of course, requires that he approach his work confidently, cheerfully, as if there were indeed an Easter bunny—and with immense concentration. At home he may read the comics to the children and talk to his wife and pay the bills all at approximately the same time, but in the affairs of space his training is intense, and his concentration focuses that training to a bright point of instant and reliable reaction that is designed to keep him alive.

"You know, some say the getting up and down in space will be minor and what's done while up there will be important. Then the piloting—the fighter pilot-test pilot-space pilot pattern—will recede and the scientists will become important. But if you took along, say, a geologist on these first flights—well, during these years of preparation, he would have focused on his rocks and his plans for exploration rather than on the flight and he would not have seen the flaws and defects in the total plan to get him up there and back again. And in fact he would kill himself by emphasizing his primary job instead of the difficulties of the transport system."

And this question of what really is important in a pioneer flight explains the lingering regret that sounds in Collins' voice when he describes what he was not able to do when he stepped out of the spacecraft and floated free a hundred-odd miles above the earth, connected by a slender 50-foot tube to the systems that kept him alive. He remembers very little of what anything looked like or of his emotional reaction to the enormity of what he was doing. But he remembers what happened, and as you listen, you begin to see the relationship between concentration in space and surviving.

The flight was Gemini 10 with John Young, in July 1966, and one of its tasks was to maneuver close to an unmanned Agena spacecraft that had been in orbit for several months. Collins would then cross over to recover a small box—a micrometeorite measuring device. Young approached from below and brought the Gemini to within 12 feet of the Agena. They inflated their spacesuits and opened the hatch. Collins stood up, gave a little push with his fingertips and floated toward the Agena.

He moved slowly enough, but the situation was nevertheless desperately, if somewhat deceptively, unstable. First, the two spacecraft and the man were traveling at some 17,000 mph, and despite weightlessness and the absence of air, the speed induces a good deal of random motion. Next, the weightless condition means that each motion sets up an unwanted countermotion and yet the three bodies are free to move independently of each other. So, arms outstretched, Collins floated toward the Agena.

"The work, you see, makes your surroundings secondary . . . the awe and wonder is pushed into the background and your immediate occupation is a series of mundane chores that have to be done. I did them, but it was at the expense of being able to look around and say, God, look at this—you know?

"Too bad in a way. There you are suspended in the most incredible position and everyone asks you, 'Really, what was it like?' and it's a little frustrating not to be able to tell them. But my whole attention was riveted on the next job in line. I wasn't blocking it out, either, you know, ignoring it, not looking down—nothing would have been more pleasant than just to float around and look."

Young held the Gemini steady and Collins floated up to the Agena. He caught its front, which is a docking collar, open like the mouth of a jar except that it is broad and blunt and makes a poor handhold. The spacesuit is stiff with pressure and makes movement awkward and hard work, but Collins went hand over hand around the collar to the Agena's top.

When he got to the top, however, he could not stop. Momentum tore loose his poor handhold and he turned two complete flips in space. Remembering the scene as he sat on a couch in his home in Houston, Collins rolled on one side, throwing his legs up to show how it had been, and you had the image of the rigid figure, fatly inflated, hardly manlike at all, tumbling off into space with his little silver line looping behind him, and suddenly the awful strangeness and the danger of it all struck you like cold wind. For in the mind's eye you saw that now the Gemini was far below and that *between* it and the rigid tumbling suited figure, the big Agena was moving independently.

Mike and Pat Collins share backyard with children—Ann, Mike and Kate—and their pet German shepherd, Dubhe. In kitchen (right) Mike gives Pat an affectionate hug.

Collins had a propellant gun that he could point where he wanted to go and it would drag him along. But it was untried in space and he was avoiding using it. Now he reached for the gun—and it was gone. It must have torn loose from his pack, he reasoned, and he fumbled about for the cord that fed the gun, found that and dragged the gun back to his hand.

"Now I was close to the end of my tether and I had sort of a sideways velocity so the gun took me back toward the Gemini in a big arcing loop. I went all the way back to the Gemini and from there to the Agena again and this time I reached inside the Agena and grabbed a handful of wires and held on with one hand while I detached the micrometeorite package with the other and brought it back to the Gemini."

You have to keep your cool, he said. You have to concentrate and keep your cool and that is how you get home.

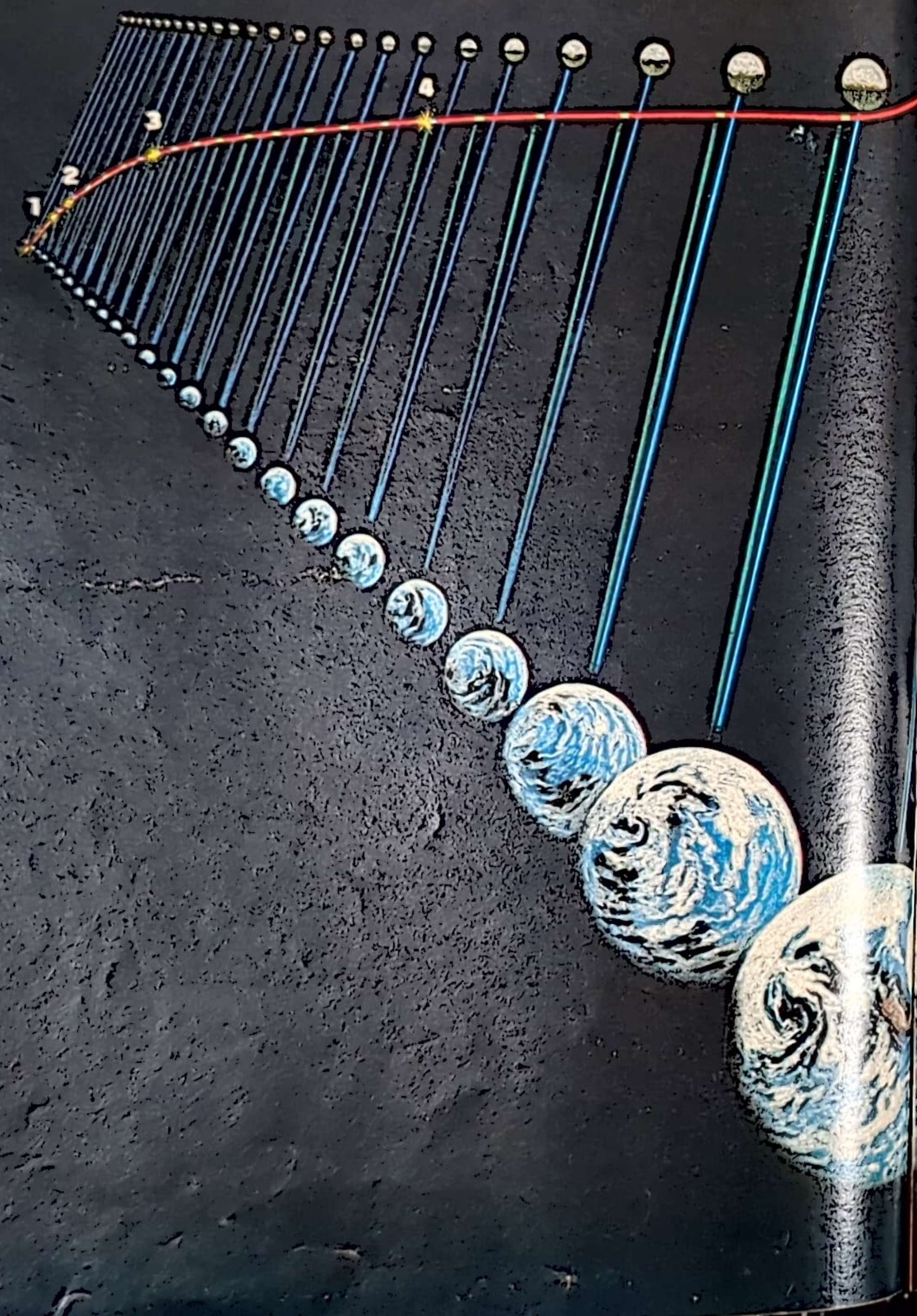
"I've never felt it *couldn't* happen to me. The moon flight could end in disaster. I don't think it will. I think the odds are good enough that I'm willing to take the risk."

Collins will be in the command module, floating around and around the moon while his companions lower themselves to its surface. If there is trouble there?

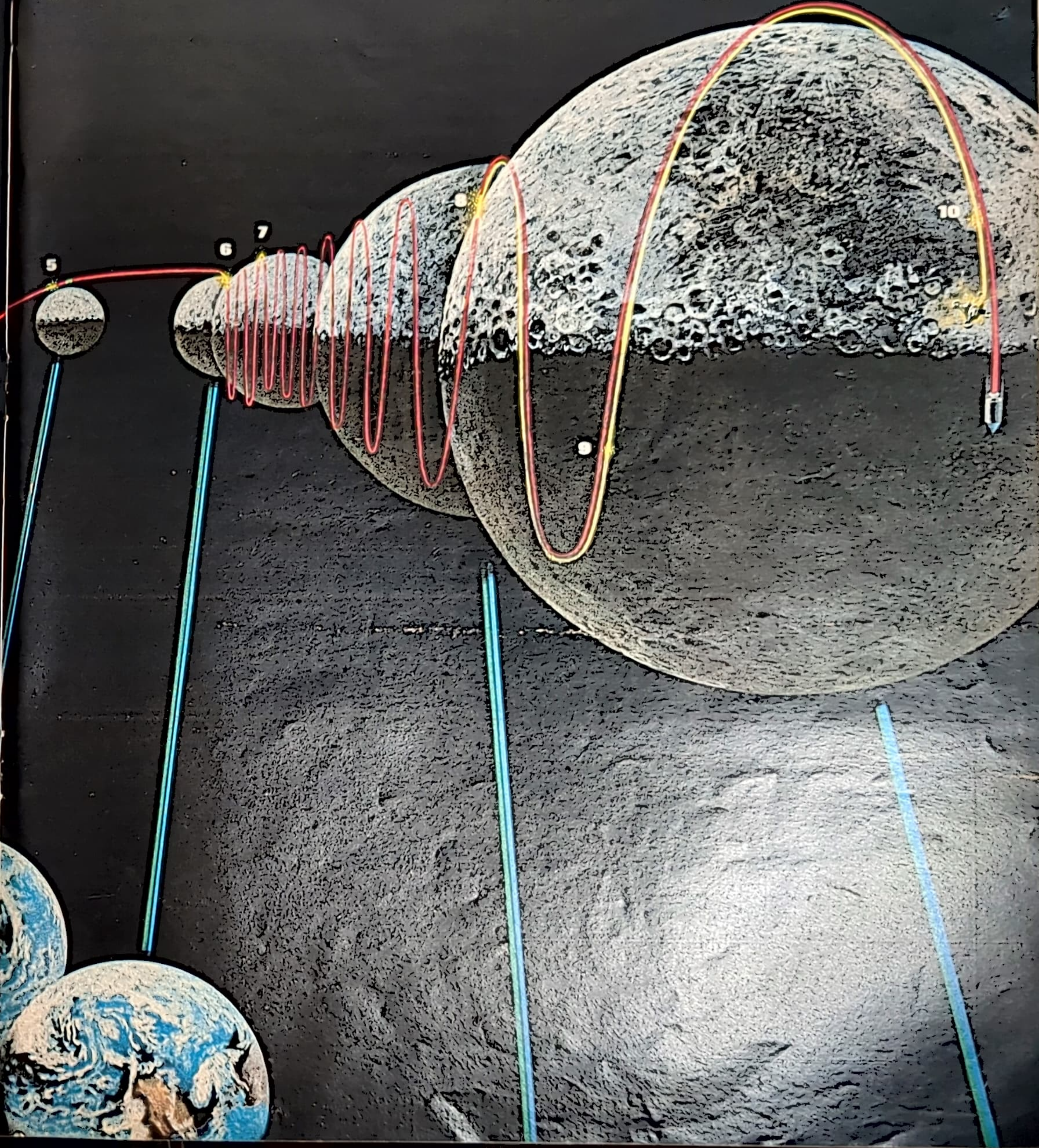
"Well, if they have difficulty on the surface of the moon, there is nothing I can do about it. So I guess the question that everyone has in the back of his mind is how do I feel about having to leave them on the lunar surface. I don't think that will happen and if it did I would do everything I could to help them, but they know and I know and Mission Control knows that there are certain categories of malfunctions where I just simply light the motor and come home without them." ◂

Profile of the Apollo 11

This is a profile of the most complex navigational adventure ever attempted—Apollo 11's flight to the moon. The painting—created by Arthur Lidov, with the assistance of Dr. K. L. Franklin of the American Museum-Hayden Planetarium—shows the 10 key maneuvers in the mission, from launch to lunar touchdown 102 hours and 47 minutes later. The red line marks the path of the Apollo spacecraft. Along it, yellow flares indicate rocket firings. The green lines which extend from the spacecraft trajectory to the earth's path and the blue lines between earth and moon show the relative positions of all three bodies at three-hour intervals for the first 72 hours. The initial three steps in the profile (grouped under No. 1) are rocket burns that push the payload out of earth orbit, nose the command ship around to dock with the lunar module and help drive the craft away from the shell that had transported the LM through the earth's atmosphere. Linked together, the two ships began a quarter-million-mile flight to the vicinity of the moon. En route, the astronauts can make four mid-course corrections (at 2, 3, 4, 5). Then, about 102 miles from the lunar surface, Apollo 11 fires its main engine (6) and slides into an elliptical path around the moon. After two orbits the engine fires again (7), driving the ship into a circular lunar path (shown as a wavy line because of the movement of the moon). Twenty hours later, the LM (yellow line) separates from the mother ship (8) and flies close by for one hour and 28 minutes. Then the LM triggers its descent engine (9) and drops into a low orbit over the moon's surface. Half an orbit later, after the final decision to land has been made, the LM burns its descent engine a second time (10)—and the spidery craft throttles gently down through the last 50,000 feet to the lunar surface. But Armstrong and Aldrin will stay on board for the next ten hours—sleeping for four of them, if they can. At last, 112 hours and 50 minutes after leaving earth, Armstrong will climb down the nine rungs of the LM's aluminum ladder and step onto the moon. He will be joined 20 minutes later by Aldrin. For the next hour and 40 minutes, the two men will work together gathering and photographing lunar rocks and setting up scientific equipment that will remain after their departure. Aboard the LM again, they will spend more than nine hours checking equipment, stowing gear and sleeping. Then they will fire the ascent engine to boost them to a rendezvous with the mother ship—and the long trip home.



Mission



The beauty of seascapes tossed and sculpted by the moon

Grip on

Photographed by GEORGE SILK

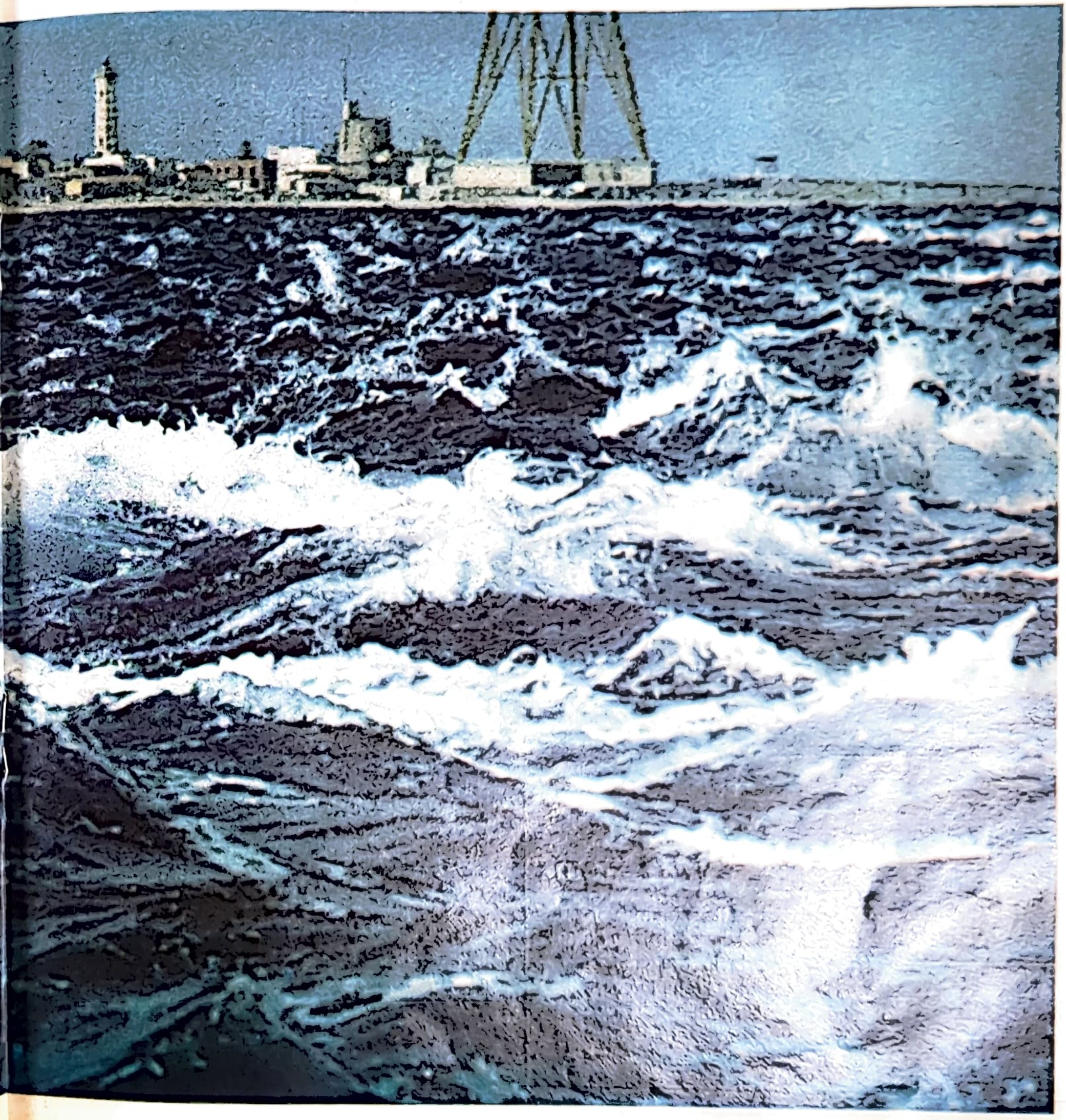
Like a lodestone of awesome power, the far-off moon tugs and the earth responds. The air stirs, the earth's crust bulges and the mighty oceans roil from pole to frozen pole. Though nothing on the planet withstands it, the pull of the moon's gravitational force is most dramatically evident in the great spectacle of the tides.

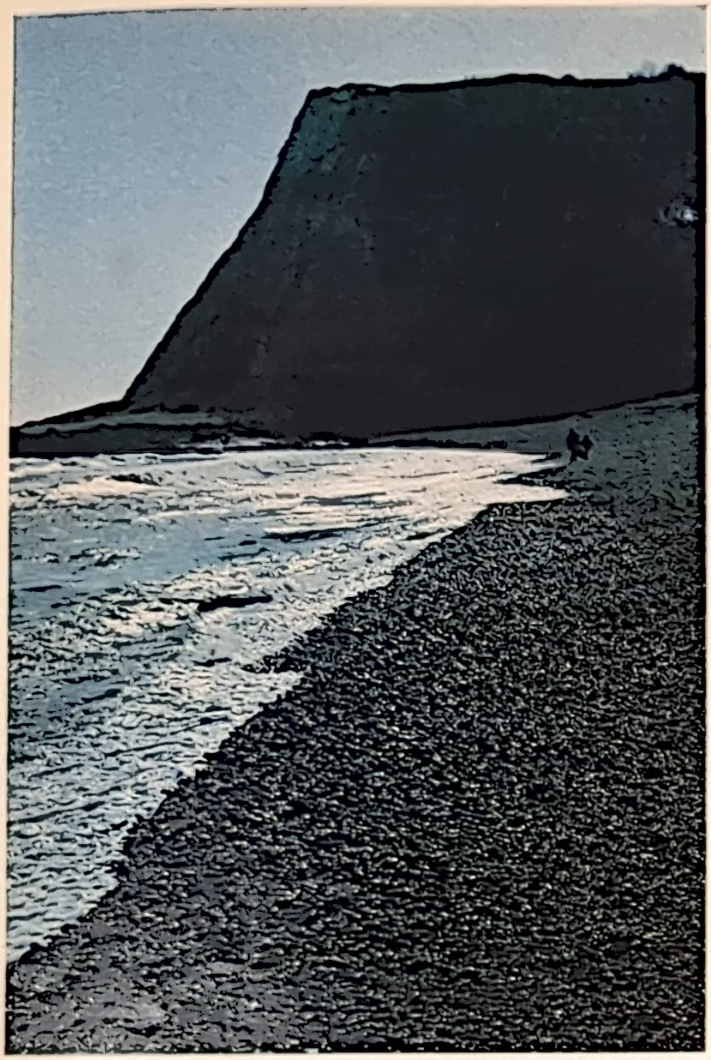
Off the coast of Capo Peloro, tidal rips froth the Strait of Messina

the Tides

Twice daily, as the earth turns first one face and then another moonward, the oceans feel its grip. Far beneath the surface of the seas, huge waves arc majestically, driving millions of gallons of water up the continental shelves. Where the flood tide arrives upon an open shore—at Saybrook Breakwater Light in Connecticut *(right)*—it may lap the coast with barely a whisper. Where it is compressed—between the rock of Scylla and the coast of Sicily, in the Strait of Messina *(below)*—the tide churns wrathfully, as when Ulysses passed there. Like Ulysses, men everywhere fear the tides and behold with wonder their ever-changing beauty.

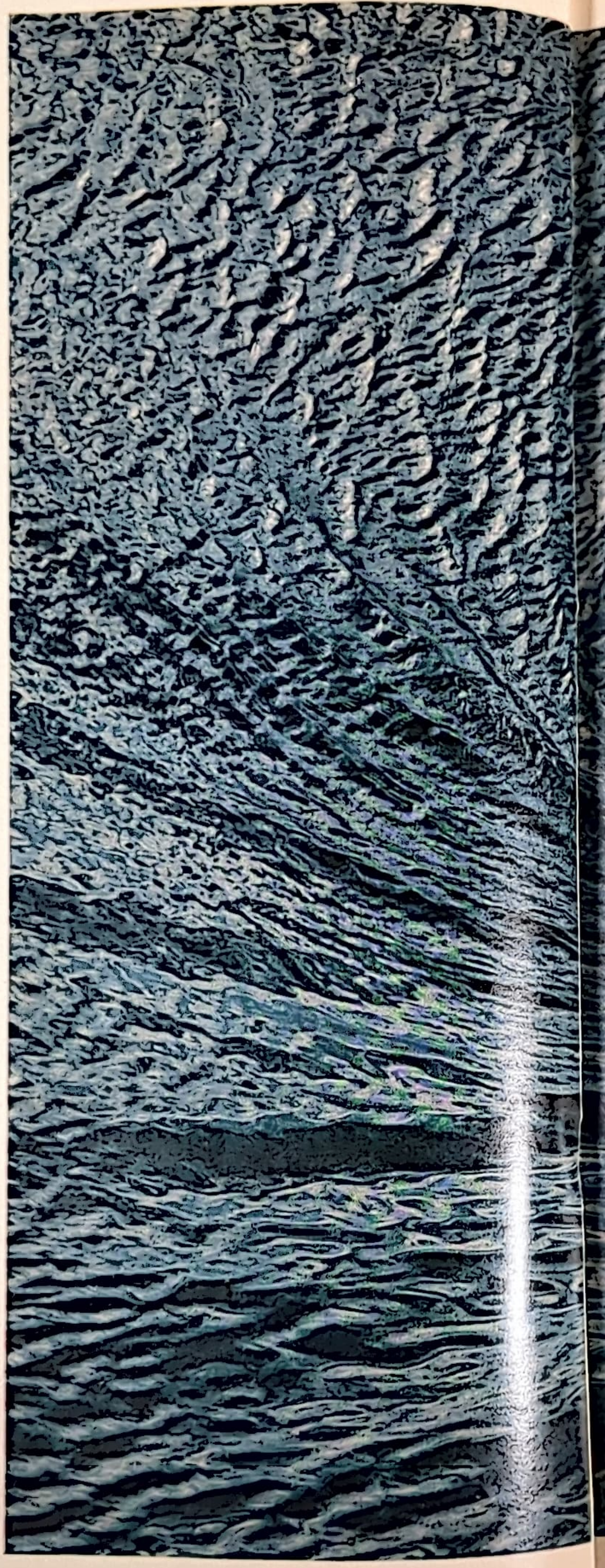
The moon pulls a tide on Long Island Sound





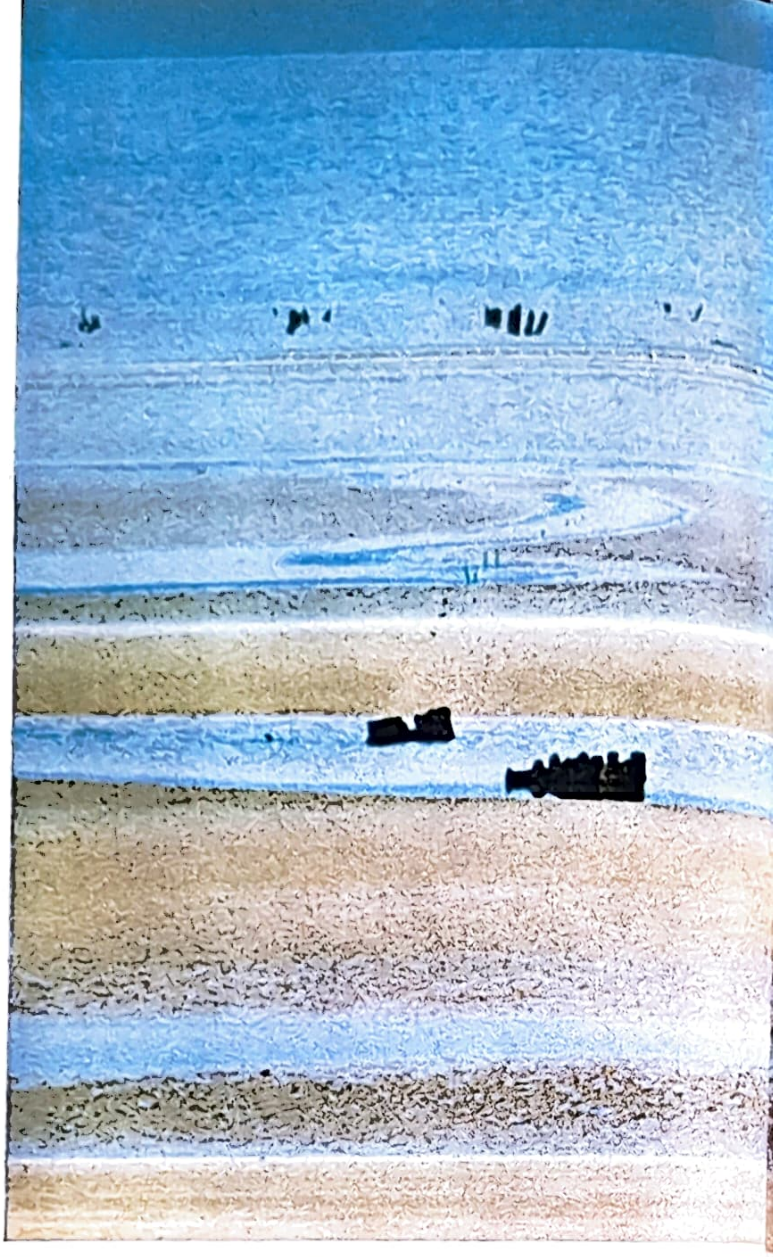
Dover Beach

On the southeast coast of England the flood tide rolls in at Dover Beach, "Where the sea meets the moon-blanched land," wrote Matthew Arnold. "Listen! you hear the grating roar/Of pebbles which the waves draw back, . . . Begin and cease, and then again begin,/With tremulous cadence slow, and bring/ The eternal note of sadness in."



Maelstrom

A fathom across at its spinning vortex, this whirlpool dances briefly on an incoming tide in the Gulf of St.-Malo, off the French coast. Maelstroms occur when tidal currents collide above an uneven ocean floor, and they can become formidable hazards to mariners.



Normandy Beach

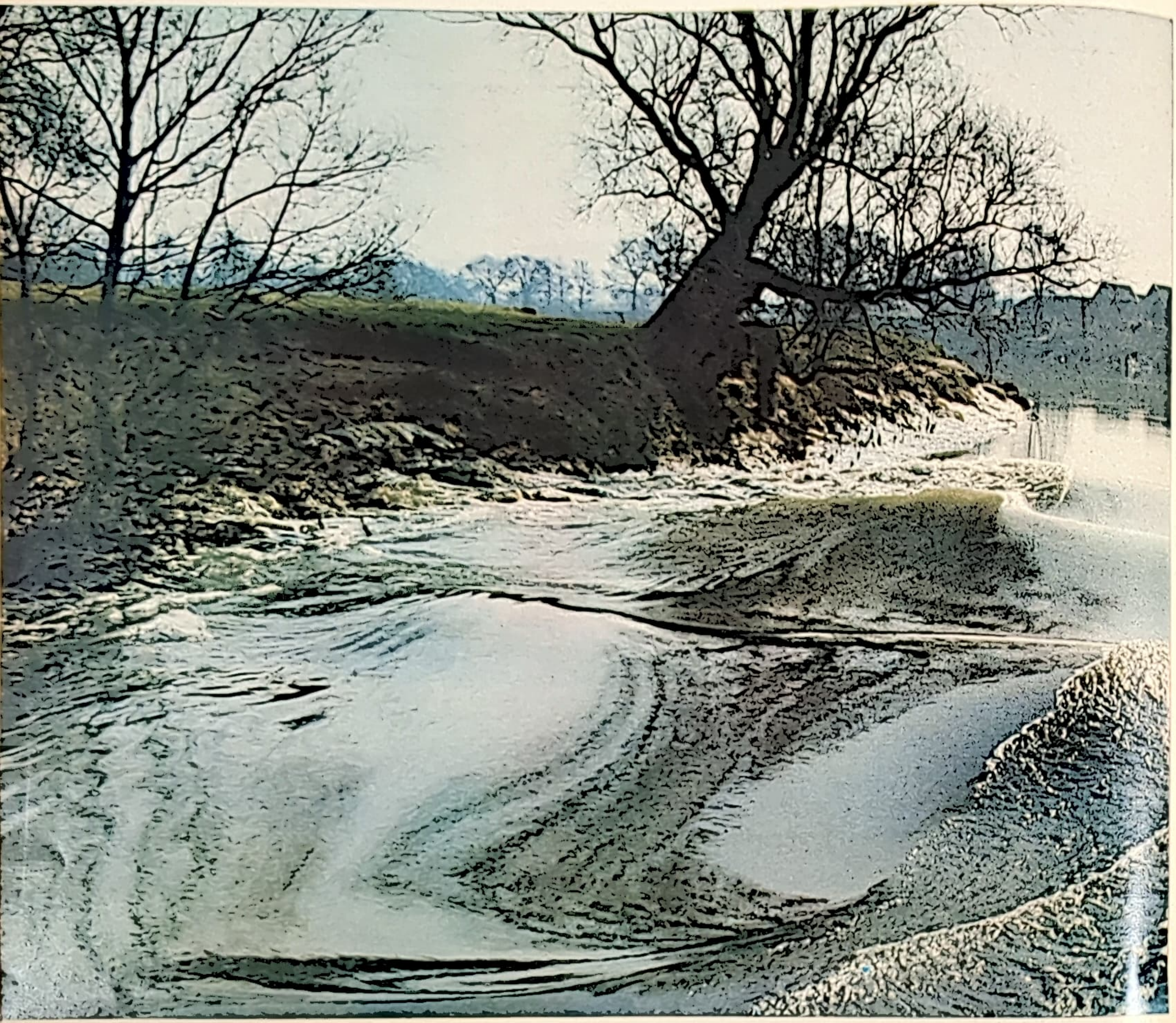
In a tidal pool dappled by a spring shower, a shrimp fisherman hauls his net on the beach that GIs of 25 years ago remember as "Utah." Strewn about him is the debris of D-day—an invasion timed by Eisenhower to give his troops full advantage of a late-rising moon and a low tide that exposed sunken barricades planted on the beach.

The Sands of Dee

Two Welsh girls drive their straying cattle back to higher ground, lest they be caught by the incoming tide on the north coast. British children still recite Charles Kingsley's verse about a girl like them who was sent out in a fog to fetch the herd and drowned. "But still the boatmen hear her call the cattle home/Across the sands of Dee!"

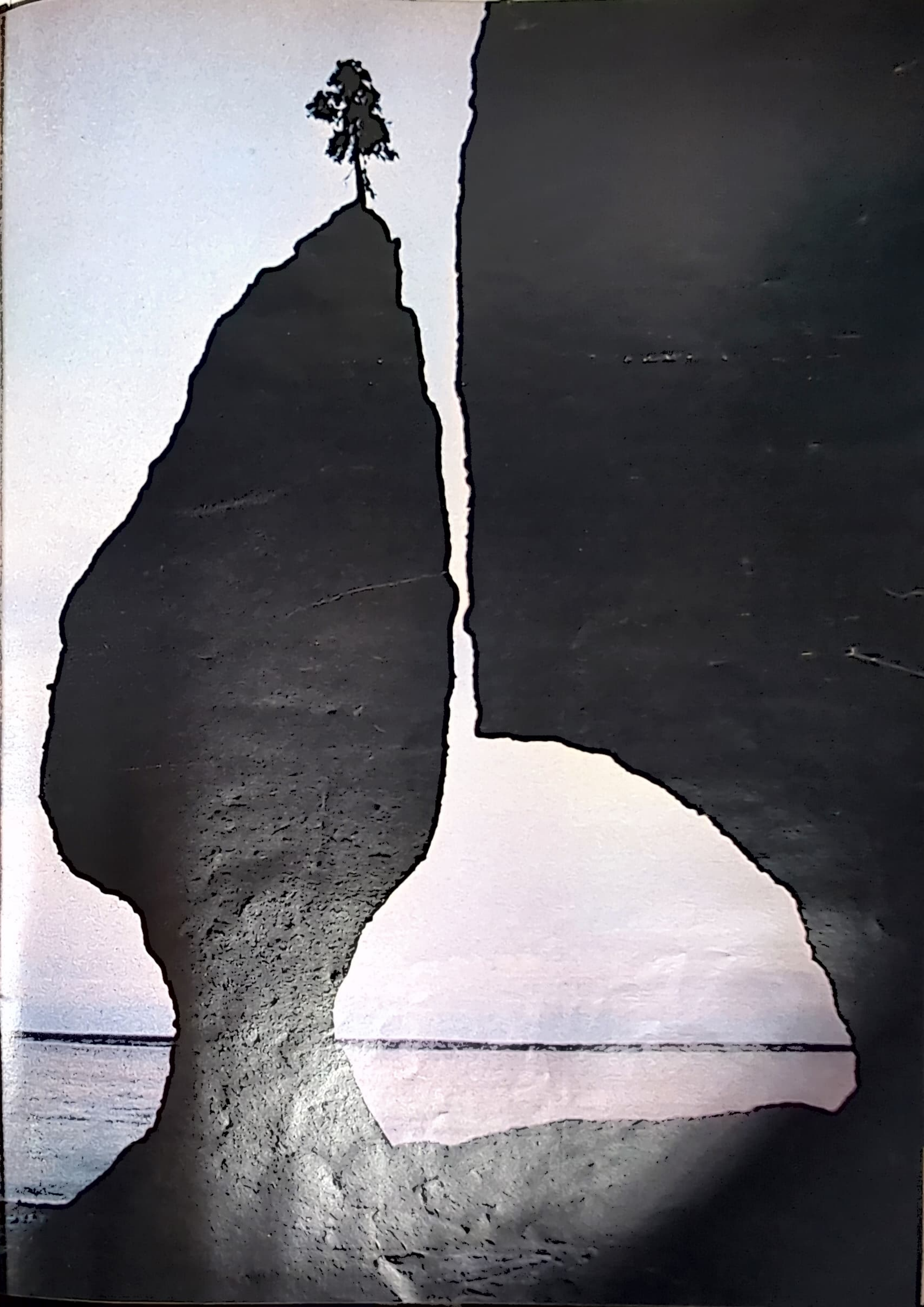
Severn River Bore

Each month the highest tides, over 40 feet, squeeze up the Severn estuary toward Gloucester, England. The compression, the contour of the river bottom and the lingering ebb current create a wall of water called a bore. It rushes ahead of the flood tide with the rumble of an express train until its force is spent some 45 miles inland.



Hopewell Rocks

A tree clings audaciously to this tide-sculpted pillar of limestone, which towers nearly 70 feet high in the Bay of Fundy in Nova Scotia. The 50-foot tide is the highest in the world, and when the waves come they will climb halfway to the tree's roots, carving still more rock from its pedestal.

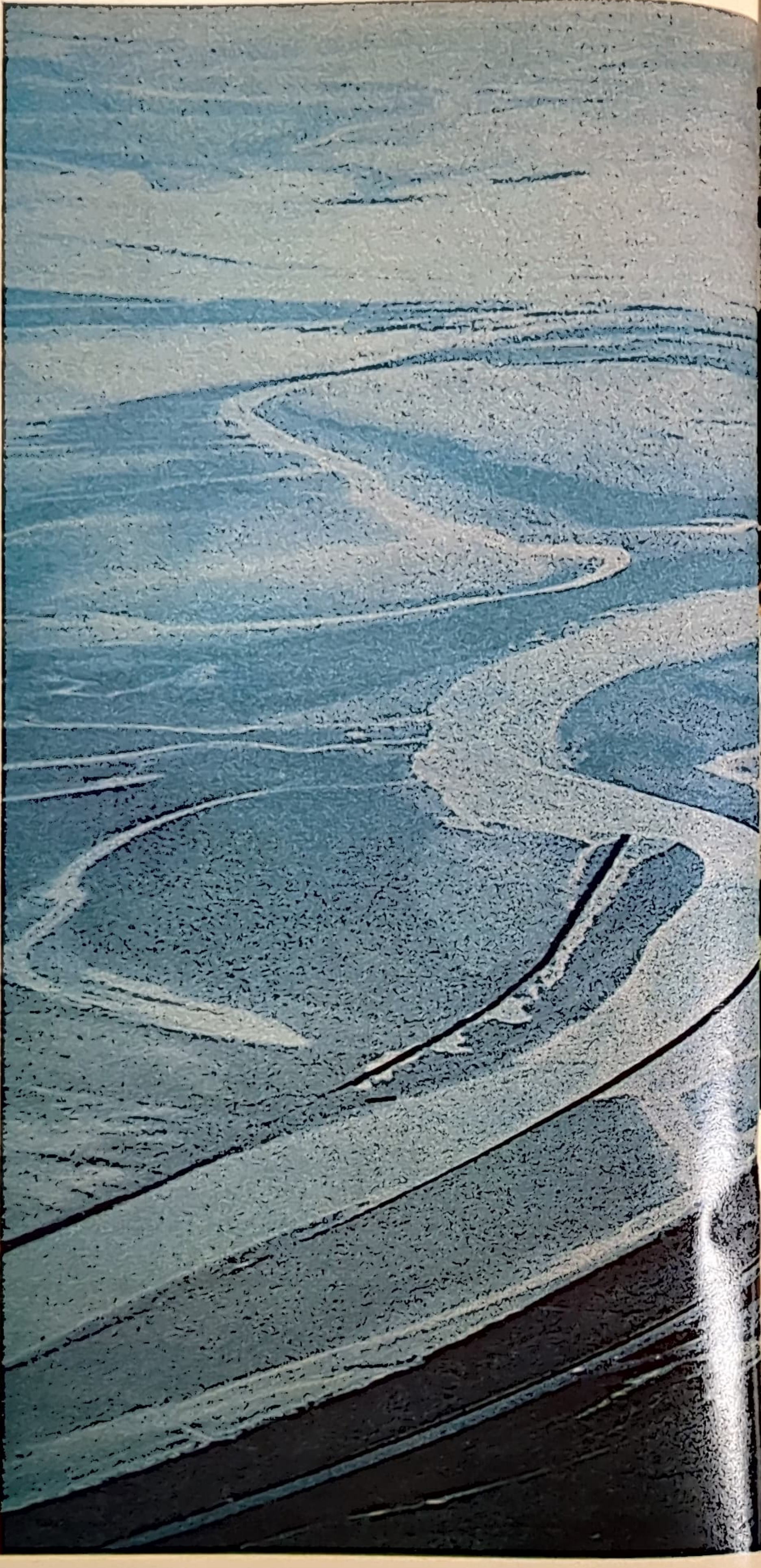


Mont-Saint-Michel

The abbey fortress of Mont-Saint-Michel stands aloof on a granite mountain off the French coast, surrounded by quicksands and serpentine estuarial canals. Across these flats come racing the biggest tides in Europe. Once each month, after the full moon, the *grande marée* sweeps in—faster, the ancients said, than a galloping horse—and reaches up into the streets of the tiny village. Centuries ago, Mont-Saint-Michel was surrounded by thick forest, but the voracious sea erased the trees without leaving a trace.

The force and size of tides depend upon the relative positions of the earth, moon and sun (which exerts less pull on the tides). Consequently, periods of maximum activity tend to come in cycles that last centuries. The last peak came around 1400. The next is expected 12 centuries from now.

The greatest tides occurred in Paleozoic times, when the moon was closer and the earth spun so rapidly that a day was only 22 hours long. Waves hundreds of feet high scoured the continents and left great sedimentary tracks behind—such as the Niagara Limestone, which stretches from Niagara Falls to Wisconsin. Friction between the turbulent oceans and their basins gradually slowed the revolving earth, until today it completes one turn in 24 hours. The tides will continue to slow the earth, adding 2/1000ths of a second to the day each passing century—until that distant time when tides will no longer course across this planet.



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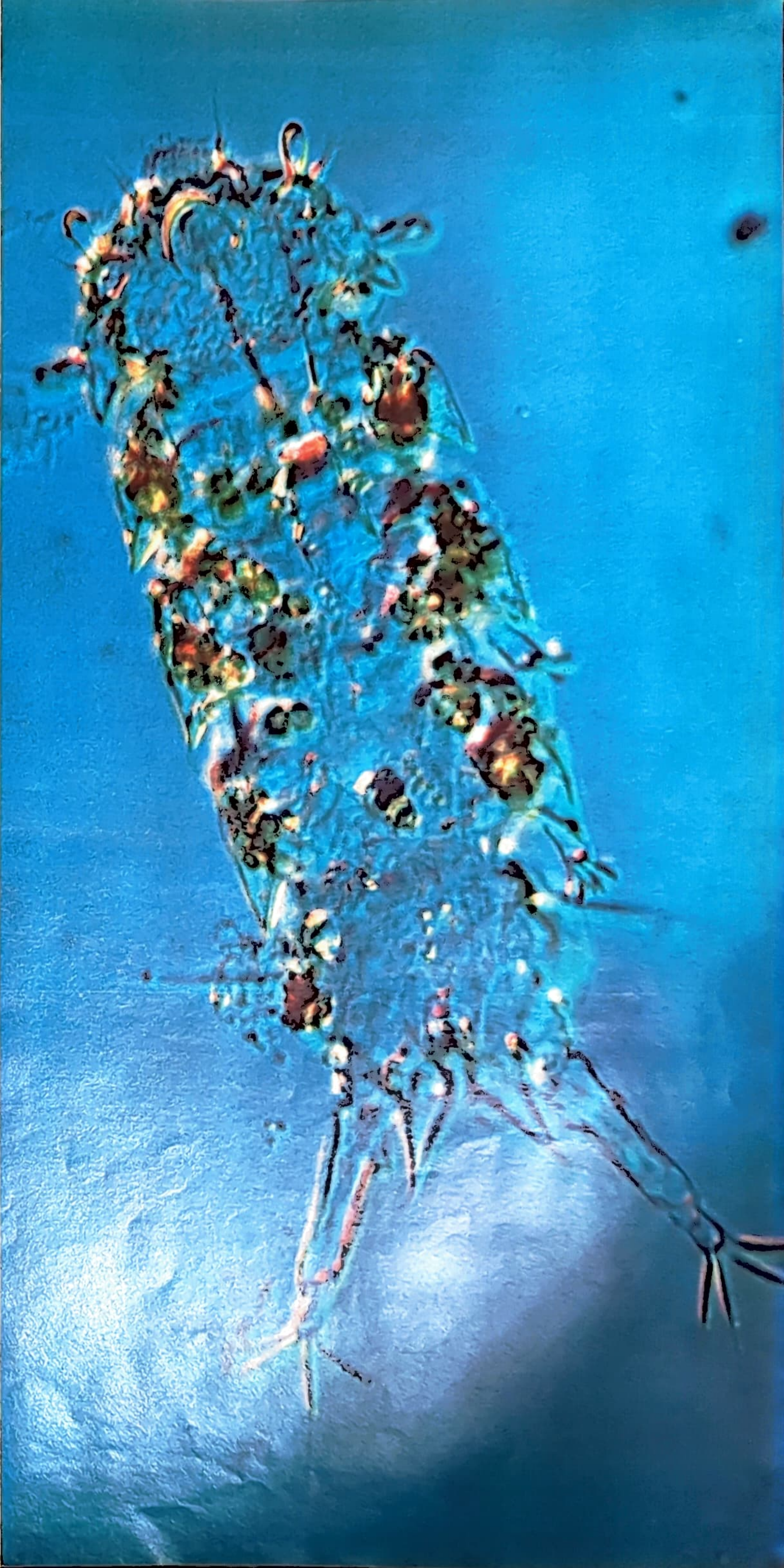
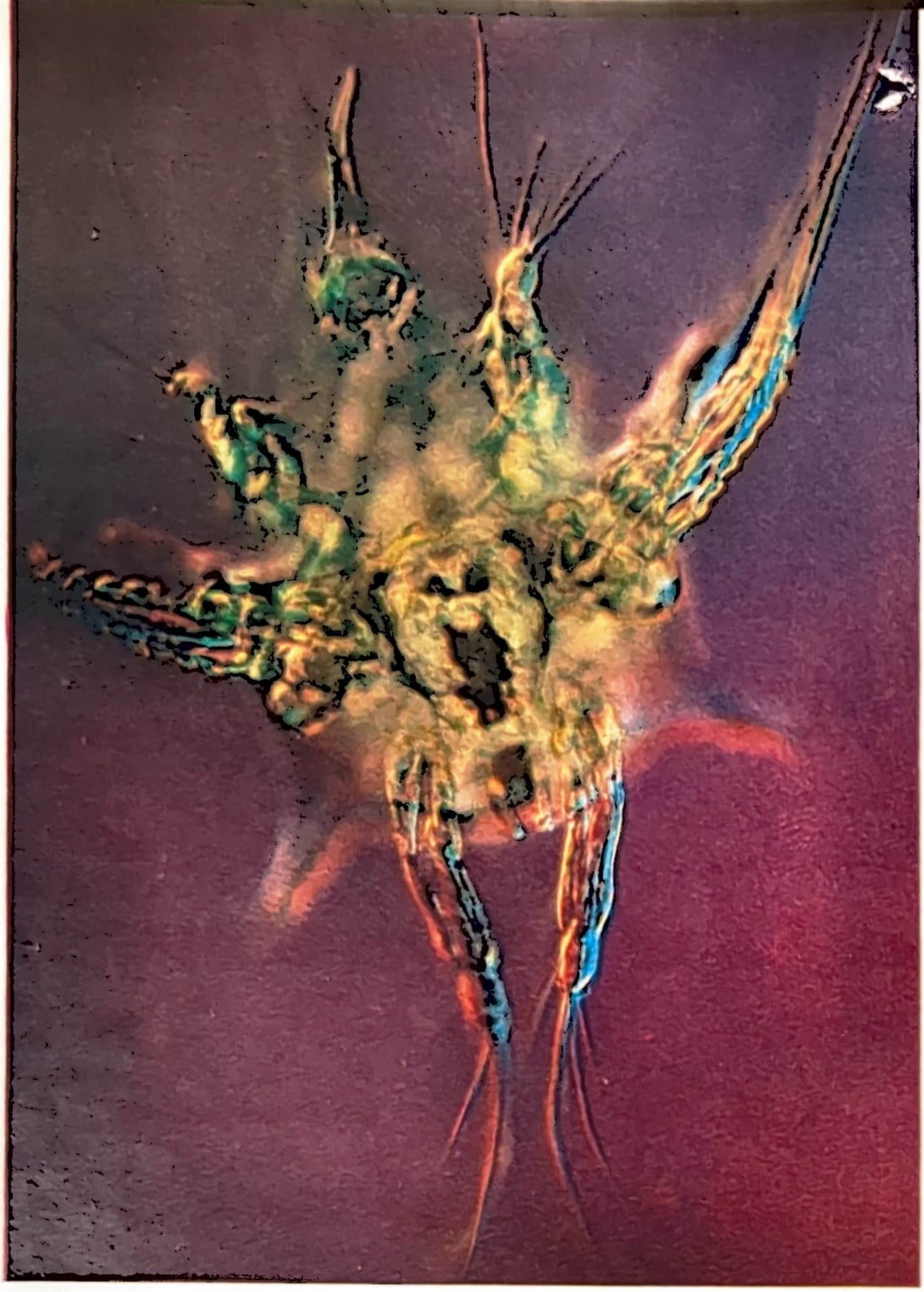
Tiny Creatures of the Tides

At the edge of the sea, in the slender strip of shore between high tide and low, lives a vast and varied population of sea creatures whose very existence depends upon the moon. Here the lunar tides have created a unique environment, perhaps the most rigorous on earth. Its inhabitants are alternately drenched and dried out, churned by the surf and baked by the sun—and yet are so marvelously adapted to their intertidal world that most of them could live nowhere else.

For three of the photographs on these pages, LIFE Photographer Fritz Goro employed a special microscope which reveals the creatures' living, three-dimensional forms. Many of them, like the tiny tardigrade shown here, and the sedentary barnacles, mussels, clams and oysters, depend upon the twice-daily surge of the tides to bring them food and a fresh supply of oxygen. Some, like the grunion, synchronize their mating habits to the moon's phases and swim to breeding places. Others trust the tides to distribute their young, casting forth larval forms *(following pages)* which swim with the plankton for hours or days until they find new places to settle down.



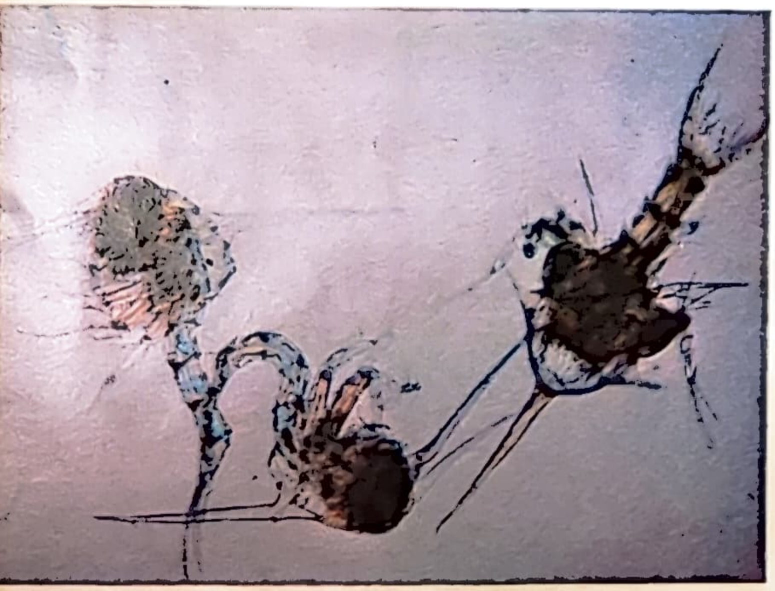
The eight-legged tardigrade or water bear, here magnified 5,000 times, lives in the microscopic spaces between grains of sand.

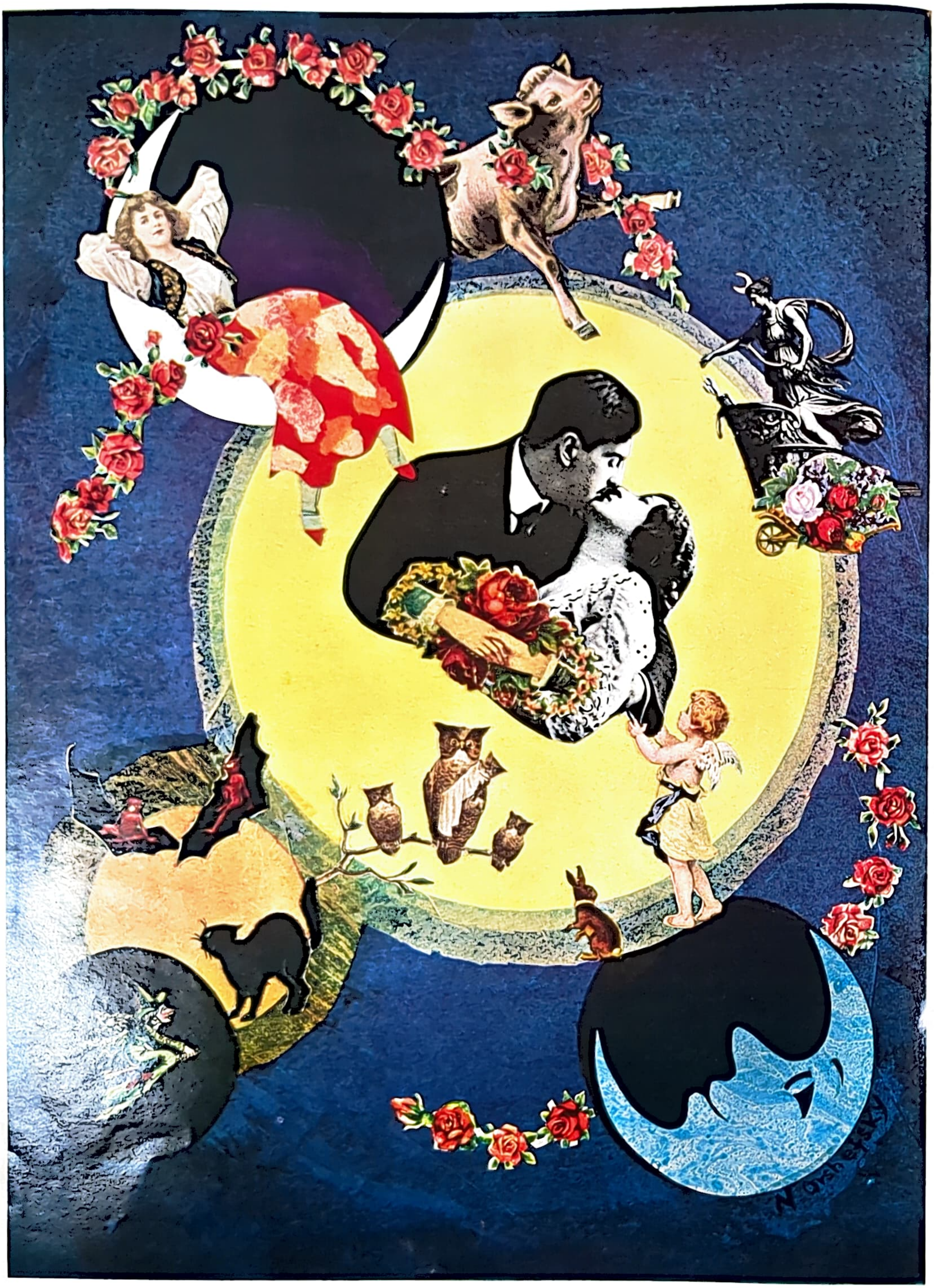


The delicate beast floating above is a baby barnacle, called a nauplius, only 1/50 of an inch long In the final stage of its metamorphosis, it will find some solid surface where it can cling for life and then turn into an adult barnacle.

At right, a plantlike animal called Tubularia is giving birth to several graceful larvae, which will float away on the next tide and attach themselves to a rock or piling just below the low-water line.

The plankton-like larvae at left, here magnified about 150 times, will grow up into rock crabs, common along the U.S. Atlantic coast. When the tide is low the adult crabs skitter about at the edge of the sea, feeding on tiny organisms.




N orshefsky

So long to the good old moon

by PAUL O'NEIL

Until the Apollo astronauts started traveling to the moon, it was a comfortable and familiar place —composed of green cheese—and the domain of the Roman goddess Diana, of lovers, witches, goblins, owls, bats and black cats.

It is only fitting that we applaud the astronauts (well-intentioned chaps to a man), but we owe them very little for the sort of moon they are now revealing to us. The damned thing is nothing but a ball of rocks and dirt. No Lunarians. No magic rays calculated to dull knives on earth and make women pregnant. The moon our grandfathers saw at its unimaginable distance in the sky had far more impact—often as a direct result of the fallacy, naiveté and astonishment with which it was regarded—than the new one is ever likely to exert. It inspired fertility rites among Asians and human sacrifice among Celts. It provided goddesses for Babylonians and Egyptians. It told Winnebagos when to plant corn. It stopped the sap in Cuban trees and started it in Broadway song writers. Whadda we got now? Craters, old boy. Craters.

Still, we remain far more subservient to the moon lore of half-forgotten centuries than most of us realize. The astronauts themselves, ironically enough, are among its servants; earth's pale and mysterious satellite inspired scientific curiosity as well as superstition among the ancients, and prompted early thought in both mathematics and astronomy. All sorts of our religious attitudes stem from primitive moon worship, from which evolved a triple deity, the idea of hell and the concept of resurrection. Our marriage ceremony has similar roots. Even the Easter bunny—and our belief in the efficacy of a rabbit's foot—are by-products of the hare-in-the-moon, which other civilizations saw where we detect the features of a man. Sunday—or rather the observance of a sabbath—was dictated by lunar rhythm and so, of course, were measurements of months and years.

While we have all grown up to take the moon for granted and to disregard all but a minute residue of lunar superstition (the most prevalent: that the full moon prompts drunkenness, wife-beating and man's innate impulse to throw bricks through plate-glass windows), it is easy enough to understand its enormous influence on the lives and emotions of primitive man. It illuminated his hostile world during the lonely and frightening hours of darkness. It was capricious. Because its orbit was elliptical and eccentric (something which drove early astronomers crazy), it not only looked bigger at certain times than at others, and rose above the horizon at different speeds, but appeared on a varying time schedule—as much as 80 minutes or as little as 22 minutes later than the previous night. And in rare instances, high clouds of volcanic dust turned it green, or even blue.

It was, in short, a very awesome and exciting sort of thing to have hanging up there above you in the dark and seems to have been apotheosized almost as soon as man looked at it. The original moon deities were male, but —doubtless because the moon's cycle corresponded with woman's menstrual period and because many peoples believed its rays, rather than Daddy's attentions, got girls with child—they were gods who took an extraordinary interest in females. Mama didn't marry Daddy in many primitive societies; when she took up housekeeping with a man there was a wedding ceremony only because it was obviously necessary that she engage in a nuptial rite with the moon —the prospective father, after all, of her children. Sometimes the headman or chief acted as the moon's representative and slept with the bride on conclusion of the ceremony. Since headmen tend to be fellows who recognize a good thing, the custom hung on in Europe as the "right of the *seigneur*"—which entitled a big landowner to sleep with daughters of his tenants on their wedding nights—as late as the 19th Century.

There were all sorts of lunar gods, but Sinn, the Babylonian one, was a particularly prime example. He became a kind of lunar trinity, for one thing, and during the three bright stages of the moon was known, progressively, as Anu, Ea and Enlil. During the dark of the moon he went to the underworld, a constituency with some of the characteristics of hell. Like all moon gods, Sinn was eventually replaced by a goddess, though not, apparently, without trying to keep the job himself. He became quite feminine—at one point being addressed as "Mother Womb, Oh Merciful Father"—but was beaten out by his daughter, Ishtar. The Babylonians believed Ishtar was menstruating when the moon was full and that it was unlucky to work or cook food on this "evil day." Since the moon was neither expanding nor diminishing at this point they also felt it was a day of "heart rest." Eventually the Babylonians got around to observing a *shabbattu* or sabbath at each quarter of the moon, or four times in a lunar month. Jews adopted the custom—though at first they thought two sabbaths a month were enough—and passed it along, in turn, to Christianity, thus surrendering us all to brunch, colored comics and the televised adventures of the Los Angeles Rams.

Moon goddesses brought man yet another religious concept which has persisted through the centuries. Almost all of them had a son who died with the old moon and was resurrected with the new one; the moon is still called "Mother of God" in obscure corners of Portugal, and the Virgin Mary —who was long equated with this phenomenon in the minds of European peasants—was known for centuries as "the Moon of the Church." Moon goddesses themselves, however, behaved with an imperious and uninhibited female savagery worthy of a Cecil B. DeMille epic. Cybele, the lunar god-

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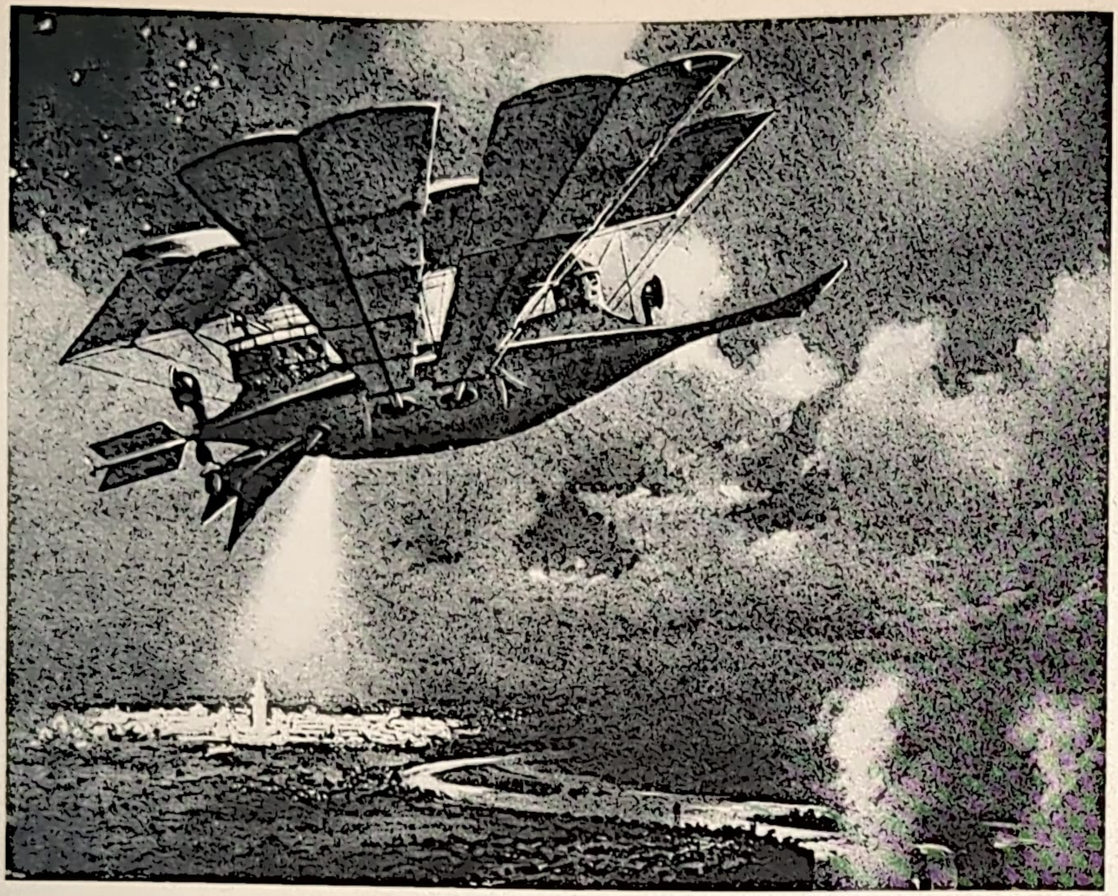

In 1901, the Pan-American Exposition at Buffalo offered a simulated trip to the moon aboard an earthbound airship, depicted here in an illustration from the exposition's souvenir catalogue

One astronomer was proud of his gold-and-silver nose

OLD MOON CONTINUED

dess worshiped in Phrygia—a corner of Turkey renowned for its orgiastic rites and plaintive music—was madly in love with her son, Attis. When Attis decided to marry a king's daughter, Mama "struck him mad"—upon which he gave up his marriage plans, castrated himself and devoted his time to telling Cybele that she was just the nicest mater a boy ever had. This worked a certain hardship, however, on Phrygian priests; they had to castrate themselves, too, while dancing around Cybele's statue, and wear women's clothing for the rest of their lives.

The moon, of course, influenced a great many nonsexual aspects of life back in the good old days, and was, as a result, a very reassuring and comforting—as well as, um, kicky—part of the human condition. Almost all early civilizations based calendars on the lunar rhythm—though few assigned such poetic names (Moon of the Corn Tasseling, Moon of the Coon Running) to lunar months as did the American Indians. The waxing and waning of the moon was held to have a fertilizing or inhibiting influence on almost everything from crops to human destiny. It was widely believed that sap rose in trees as the moon got bigger and retreated as it waned; good lumber, thus, could be cut only when the moon was diminishing, and Cuban law forbade the felling of trees for railroad ties during the moon's period of increase as late as 1928. The Emperor Tiberius—who had very thin hair—consulted his barber only after the new moon. The ancient Gauls were afraid to begin a journey or a battle until the new moon appeared, and so were the Spartans—so much so that they simply could not bring themselves to join the Athenians against the Persians at the Battle of Marathon.

The advent of astronomy—which started in its simplest forms thousands of years before Christ, and is almost certainly the oldest science—did not induce an end to man's belief in this sort of pervasive lunar influence. Early astronomers, for one thing, were often also astrologers and all of them labored under erroneous, though fascinating, ideas about the heavenly bodies they observed in the sky. Plato thought the moon was composed of a fiery substance and Xenophanes believed it was a thick cloud. Still, it was so big and peculiar that it prompted innumerable avenues of speculation and a complex use of mathematics.

Occasionally, along the slow parade of centuries, men hit on astonishingly perceptive ideas about it. Pythagoras (582-500 B.C.) believed the moon (and the earth, as well) was a sphere. Followers of Hipparchus of Nicaea (190-120 B.C.) were able to predict its eclipses almost to the hour. But most astronomers believed the earth was the center of the universe, that the sun as well as the moon revolved around it and, often, that the sky was a huge, hollow translucent sphere which enclosed the atmosphere and to which the stars were fastened like lights on a nightclub ceiling. The innovative thinker could risk his neck: Anaxagoras of Clazomenae (a mentor of Socrates) was condemned to death in Athens for saying the moon was made of the same stuff as the earth.

Moon watching was still a risky business, as indeed was the rest of astronomy, at the conjunction of the 16th and 17th Centuries when a trio of its most famous practitioners—Denmark's Tycho Brahe, Germany's Johannes Kepler and Italy's Galileo Galileo—burst upon the world and laid the groundwork for modern concepts of the universe. An astronomer needed an enormous ego and an equally enormous sense of bravado—or the ability to keep his mouth shut—if he wanted to engage in his science for long, and was not apt to be the sort of fellow who would find favor, today, with the personnel department of NASA.

Brahe was obstinate, irritable and as proud as a peacock of a gold-and-silver nose he designed for himself after one Manderupius Pasbergius whacked off the original in a duel over a problem in mathematics. He maintained an idiot named Lep who crawled under his table at meals and snapped up scraps the eminent scientist flipped to him. Brahe was uncommonly agile, for all this, at coping with the vicissitudes of his profession. He was a great pal of Denmark's King Frederick II, talked that monarch out of enormous sums of money, built an island castle as an observatory, staffed it with servants, imported "English barking dogs" to keep the curious at bay and enjoyed 21 years of vastly comfortable astronomical calculation and self-applause. When the king died and the royal court cut off

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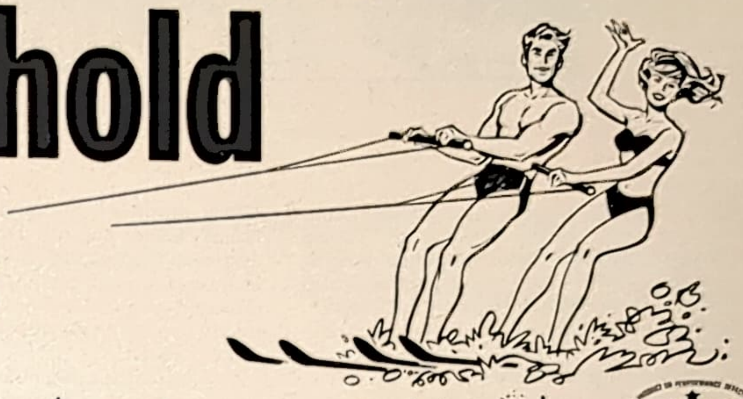
Take a Vacation from Odors and Household Germs



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his funds Brahe simply moved to Prague and talked Emperor Rudolph out of more money and another castle yet.

But while the great Dane made important and valid discoveries about the moon's "intricate" path around the earth, he was also soothingly superstitious about it. He died believing it exerted an influence on crops and trees, and was scared to death of hares, the moon animals. If one crossed his path when he was starting a journey he would hurry back indoors to cancel out ill fortune before setting forth again. The Italian genius Galileo took a more realistic view of nature, had more shattering things to say, and paid for them in the end—although he, too, was adept at buttering up Popes and nobles and at living well. Galileo was the first to make really efficient telescopes (some of his best magnified up to 32 times) and discovered the kind of moon—with mountains, craters and canyons—which the astronauts know today. This horrified the experts, among them Aristotelians who were certain it was a smooth, polished sphere. Galileo was a charming fellow, but one with a sardonic sense of humor, and he did not endear himself to these skeptics by daring them to look for themselves—and laughing uproariously when they claimed his mountains were not only impious but did not, since they had been seen by artificial means, exist. Outspokenness eventually did him in; he was tried by the Inquisition for insisting the earth revolved around the sun and spent his declining years as a prisoner in his own house.

In this 17th Century drawing, superstitious peasants see omens of hard times in the night sky

Johannes Kepler believed the moon influenced tides as "a lodestone attracts iron" but—whether out of caution or actual belief—offered a very curious explanation of the mechanics of the thing. He professed to believe that the earth was an enormous living animal and that this "terrene monster" produced a rise and fall of the oceans by breathing them in and out of its gills—on a rhythmic schedule because the moon influenced its periods of wakefulness and sleep. He also believed the moon itself was subject to intense cold and parching heat, had enormous mountains and might be populated by prehistoric lizards, but masked these ideas as fiction in *Somnium*—the tale of a supernatural moon voyage published after his death.

Kepler, whatever his motivation, was not alone in expressing himself in this early form of science fiction. The moon inspired writers to similar imaginary lunar voyages all through the 17th and 18th Centuries. These tales incorporated a mix of scientific knowledge, wishful thinking and unabashed speculation. They ranged from parody to straight adventure, set a precedent for later works like *Robinson Crusoe*, *Gulliver's Travels* and the stories of Jules Verne and H. G. Wells, and were a great deal more interesting—if one may be pardoned for saying so—than anything the astronauts are likely to experience. Domingo Gonsales, hero of Francis Godwin's *Man in the Moon* (1638), was towed up to the moon by 25 huge swans and found himself among men who were 28 feet tall; France's soldier, duelist and satirist Cyrano de Bergerac took an imaginary lunar trip by means of a firecracker chariot and was instantly jailed there for saying there were people on earth.

An Earthman meets a lunar giant in this illustration for a satirical book by Cyrano de Bergerac

Nothing in man's long history of lunar speculation, however, so twitted and titillated Americans and Europeans as did "The Celebrated Moon Story," a scientific hoax which the New York *Sun* published over a period of 11 days in August and September, 1835. It reported "Great Astronomical Discoveries Lately Made by Sir John Herschel, LL.D., F.R.S. & etc. at the Cape of Good Hope"—namely, Herschel's invention and use of a telescope so fantastically powerful as to bring lunar objects no bigger than 18 inches into clear view on earth—and was, the *Sun* solemnly assured its readers, simply being reprinted in New York after original publication in something called the supplement to the Edinburgh *Journal of Science*. Crowds mobbed the paper day after day for the latest editions—and not a soul among them seemed to suspect that 1) there was no Edinburgh *Journal of Science*, or that 2) even though there was a scientist named John Herschel, the lunar wonders attributed to him were being invented, instalment after scribbled instalment, by *Sun* editor Richard Adams Locke.

Their credulousness is easily understood. The Moon Story—which has remained among the most obscure of American literary curiosities—had the ring of veracity. Its author, Locke, was a graduate of Cambridge University and a man who was well grounded in the scientific theory of the day. He knew a great deal about optics and his tongue-in-cheek recital of ideas upon which Astronomer Herschel—who actually was making observations at the Cape of Good Hope—had supposedly built his enormous telescope sounded splendidly complex and convincing. Locke described a "prodigious lens, 24 feet in diameter, weighing 14,826 pounds, and boasting a magnifying power of 42,000" which became part of Herschel's great telescope; he asked his readers to visualize the long teams of oxen and "companies of Dutch Boors" needed to haul it across the plains east of Capetown, and the vast pillars upon which it was suspended 150 feet above ground.

This was all New Yorkers needed to be convinced that every word of the Moon Story was the sensational truth; the *Sun*'s steam press clattered away night and day pumping out newspapers for the enormous street crowds, and tension built up in the city with each delicious instalment. Locke's burlesque—according to his friend William Griggs—got the final gloss of verisimilitude from a "highly respectable looking elderly gentleman in a fine broadcloth Quaker suit" who told the crowd before the *Sun* building "that he was fortunately engaged in commercial business on the East India Docks in London when the vast lens of seven tons weight and the whole gigantic apparatus for the telescope was taken on board an East India ship, and that he, himself, saw it craned on board. He added that the statement in the *Sun*'s narrative that the shipment was made

CONTINUED

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from St. Catherine's Docks was, therefore, evidently an error on the part of the Edinburgh writer."

Looking at the moon through Sir John's imaginary telescope sounded, as Locke described it, very much like watching a big color TV screen. Herschel's apparatus could zoom in for close-ups—while gangs of "domesticated Hottentots" worked a series of windlasses which regulated the lenses—or pull back for a more general survey of forests, glades and mountains. New Yorkers learned, to their fascination, that "lunar quadrupeds" all had a remarkable fleshy appendage over the eyes, a hairy veil shaped like the frontal outline of a headpiece known to ladies as Mary Queen of Scots cap—which lifted and lowered by means of the ears. The "acute mind" of Dr. Herschel instantly deduced "that this was a providential contrivance to protect the eyes from great extremes of light and darkness." The animals and birds—tiny bison, lead-colored goats, tailless beavers which walked on hind legs, horned bears, long-tailed blue pheasants and exotic waterfowl—were both curious and yet satisfyingly similar to their counterparts on earth.

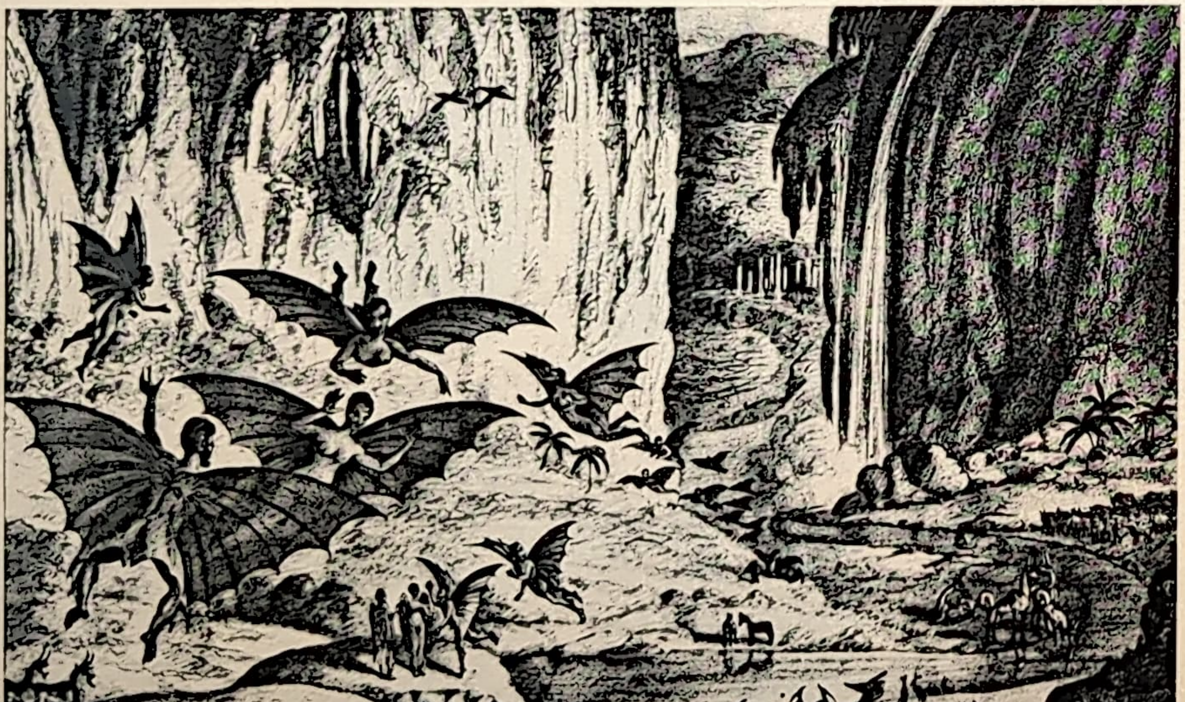
The Moon Story was full of suspense. The great telescope not only kept zeroing in on vast treasures —a crimson mountain with long crevices full of virgin gold and "equi-triangular temples of polished sapphire"—but threatened to break down and ruin everything. At one point the big lens was turned incorrectly, caught the rays of the sun, and burned a 15-foot hole through the observatory. But repairs were made and the *Sun*'s readers were finally privileged to see lunar humanoids through Sir John's astonished eyes. These creatures were "four feet in height, covered, except on the face, with short, copper-colored hair, and had wings composed of a thin membrane lying snugly along their backs." The astronomer felt they were "an improvement upon the orang-outang, being more open and intelligent in expression."

The occasional cries of indignation prompted by all this monkey business was almost completely drowned by applause—not the least of it from other newspapers. The New York *Times* called the revelations "wonderful, probable and plausible." Thousands went on insisting it was true even when it was clearly exposed—after the passage of a few weeks—as an ingenious hoax. Mails from Europe, meanwhile, disclosed that it was being republished in England, France, Germany, Portugal and Spain—and was being received by foreign millions as the revealed word of a beneficent technology. When the French Academy of Sciences assailed it as a profanation of Sir John's reputation, Parisians somehow got the idea that members were debating its merits. Herschel thought it was all very funny. The Moon Story lived on for decades among the faithful—who treated skeptics with "pity and contempt" and died believing it "the sacred and delightful truth."

Ah, well—we know better now. But are we absolutely sure—science or no science—that the moon does not really influence living things on earth? How about the five-testicled sea urchins of Suez which are triggered to the act of spawning at every full moon? How about the grunions which come to the beaches of California in summer only on three nights following fruition of the lunar cycle? Why does the Palolo worm of Samoa discharge its eggs early in the morning one week after the full moon in November—and never, never, never at any other time? One must assume, at the very least, that it is not yet aware of the Apollo program and the imminent demise of the last lunar illusion.

Still, it is possible to predict that the moon has some oldtime excitement yet in store for the inhabitants of our earth and that it is going to scare hell out of our progeny if any of them lasts long enough. Few of us realize it once whirled around our planet every five hours and at a distance of only 15,000 miles—and that it has been retreating from us, at the rate of five feet a century, ever since. Neither have many of us troubled to notice that the earth has been rotating 2/1,000ths of a second more slowly every hundred years. But these effects, given a few million more millennia, are going to develop into something absolutely sen-sa-tion-al. The earth day and the lunar month will eventually become the same—47 of our days. The moon will start creeping back to us . . . closer . . . closer. . . . closer. It won't hit us—or at least today's mathematicians don't think so. But it will break into a zillion pieces and rearrange itself into a ring of orbiting fragments across which future astronauts will doubtless scamper like Eliza scampered across the ice. So give 'er a little time, kids, and hang . . . on . . . to . . . your . . . HATS! ◄

In 1835, New York Sun articles by Richard Locke regaled readers with descriptions of lunar wonders—including this illustration of moon man-bats—that had been discovered by a fantastically powerful telescope



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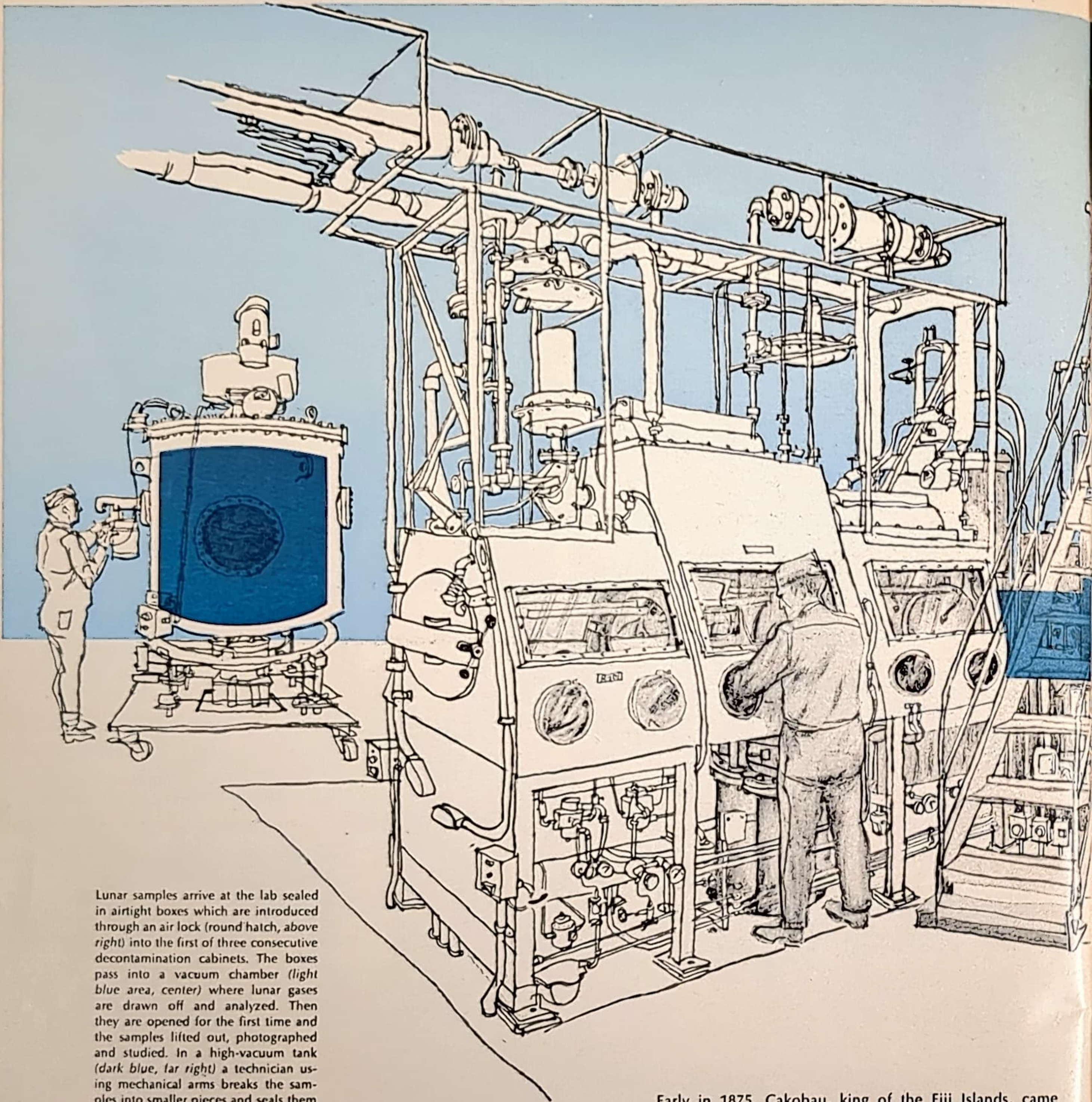
After the Moon Flight, a Wall

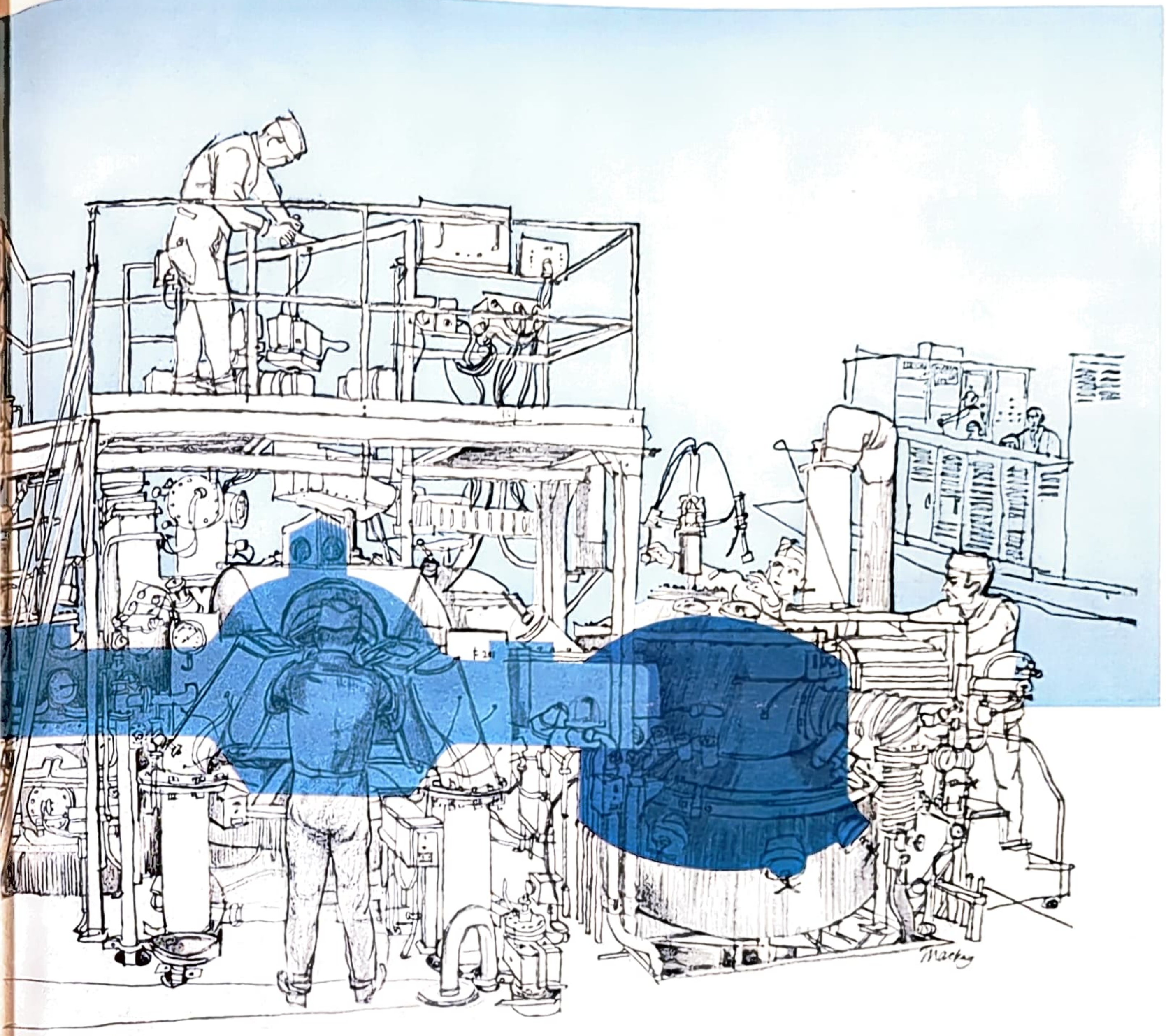


Lunar samples arrive at the lab sealed in airtight boxes which are introduced through an air lock (round hatch, *above right*) into the first of three consecutive decontamination cabinets. The boxes pass into a vacuum chamber (*light blue area, center*) where lunar gases are drawn off and analyzed. Then they are opened for the first time and the samples lifted out, photographed and studied. In a high-vacuum tank (*dark blue, far right*) a technician using mechanical arms breaks the samples into smaller pieces and seals them in transparent vacuum boxes. Thus packaged, the lunar material is ready for transfer to other testing areas—or for storage in high-vacuum containers like the one at far left (*dark blue*).

Early in 1875, Cakobau, king of the Fiji Islands, came back from a visit to Australia with a case of measles—a disease not usually fatal elsewhere but totally unknown in the Fijis. In a matter of weeks Cakobau's illness became an epidemic. Not having any natural resistance to the contagion, 40,000 natives died of the new disease.

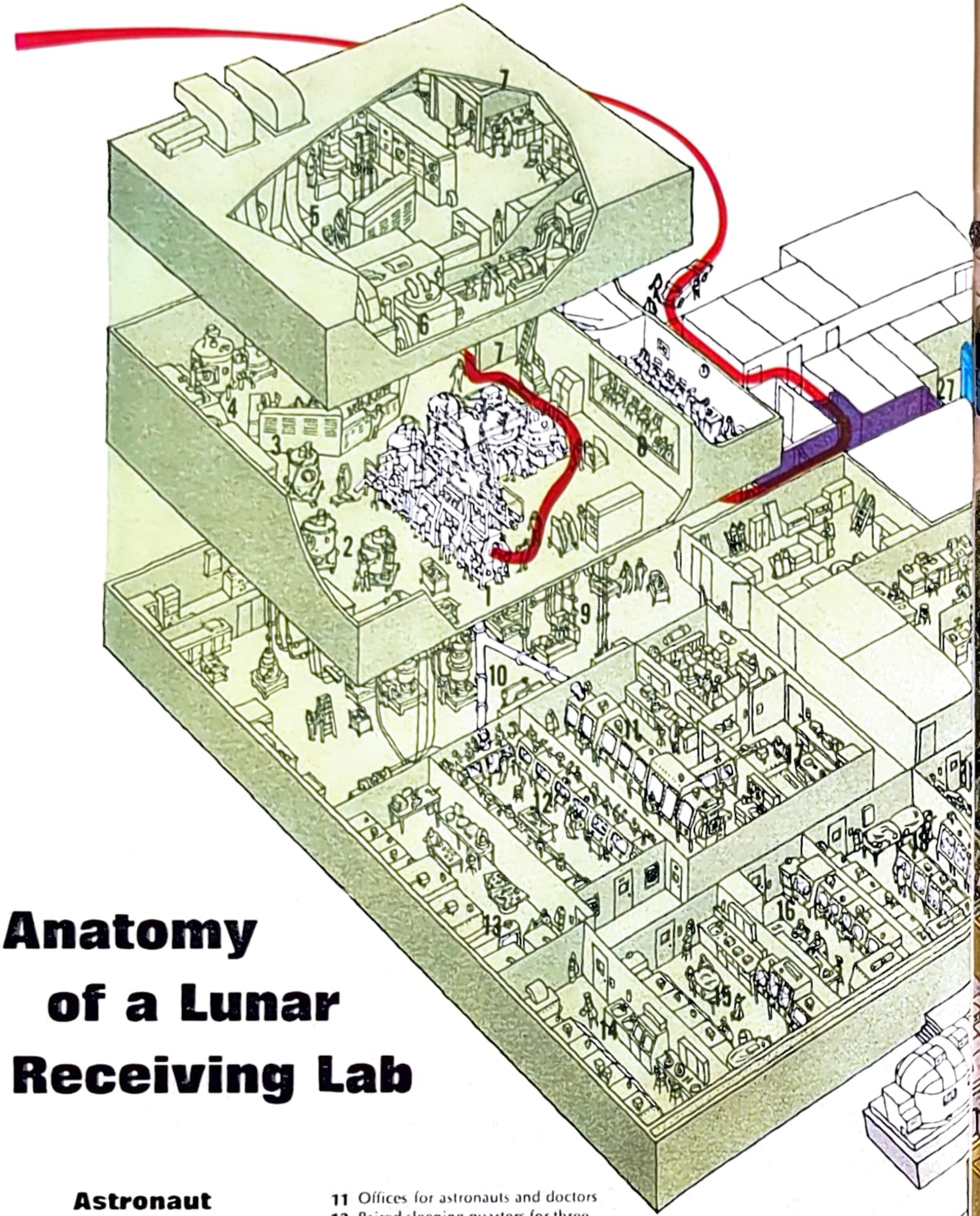
The flight of Apollo 11 raises, for the first time in man's history, somewhat the same problem for earth itself. No scientist seriously believes that the astronauts

against the Unknown



Drawings by DONALD MACKAY

will bring back a lethal contaminant from the moon either on their persons or in the rock samples they will gather. The chances of finding life of any sort there—bacteria, fungi or virus—are remote. But the possibility does exist, and against potential disaster NASA has erected an enormously sophisticated series of barriers. They guarantee, among other things, that the astronauts' homecoming will be less festive than any other—no happy ceremony on the deck of the carrier, no joyful embrace of wife and kid back at Houston. From the moment they emerge from their capsule, the astronauts and their precious moon samples will be sealed off—literally—from the rest of the world in the stiffest quarantine ever devised by man. Most of their confinement will be spent inside the $8.5 million Lunar Receiving Laboratory near Houston—not simply in hiding, of course, but in undergoing detailed and exhaustive study. The inner workings of the lab are illustrated on this and the following pages.



Anatomy of a Lunar Receiving Lab

Routes into biologically isolated sectors of the Lunar Receiving Lab are shown here by red lines. At upper left, lunar samples arrive and are taken to vacuum system and radiation lab by elevator. Other entrances indicated are for astronauts, for the command module, for food and laundry. Lines at far right show where lab personnel come and go through ultraviolet airlocks (purple).

Lunar Sample Laboratory

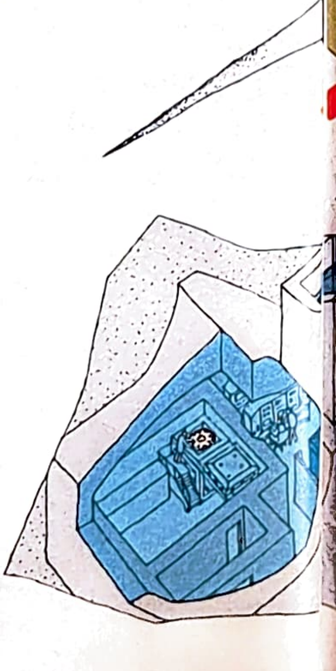
More than 100 scientists and technicians will perform tests with lunar materials in the lab area, shaded green.

1 Vacuum system where lunar material is received and processed
2 Carousels for storage and transfer of lunar material
3 Controls for vacuum system
4 Equipment for preflight tool sterilization
5 Gas analysis laboratory
6 Special air conditioning system to sterilize air entering and leaving building
7 Elevator
8 Viewing room for participating scientists
9 Pump room and electrical support equipment for vacuum system
10 Transfer tubes for moving samples directly from vacuum system to labs
11 Physical-chemical test lab —mineralogy, petrology, geochemistry
12 Bio-preparation lab where lunar material is prepared, weighed and packaged for distribution
13 Bio-analysis lab for blood tests and other tests on mice
14 Holding lab for germ-free mice
15 Holding lab for conventional mice
16 Lunar microbiology lab to isolate, identify and possibly grow lunar microorganisms
17 Spectrographic lab and darkroom (connects to 11)
18 Bird, fish and invertebrate lab where shrimp, quail, cockroaches, oysters and other creatures are exposed to lunar material
19 Microbiology lab for test cultures of lunar and astronaut material
20 Egg and tissue culture lab (support and additional facilities for 21)
21 Crew virology lab for postflight virological analysis of astronauts
22 Plant lab where germ-free algae, spores, seeds and seedlings will be exposed to lunar material
23 Entrance to lunar sample operations area. Showers and facilities for all personnel passing in and out to change clothing
24 Autoclave for sterilizing all material entering or leaving area
25 Bio-safety lab to monitor all systems
26 Support offices
27 Entrance to radiation counting lab

Astronaut Reception Area

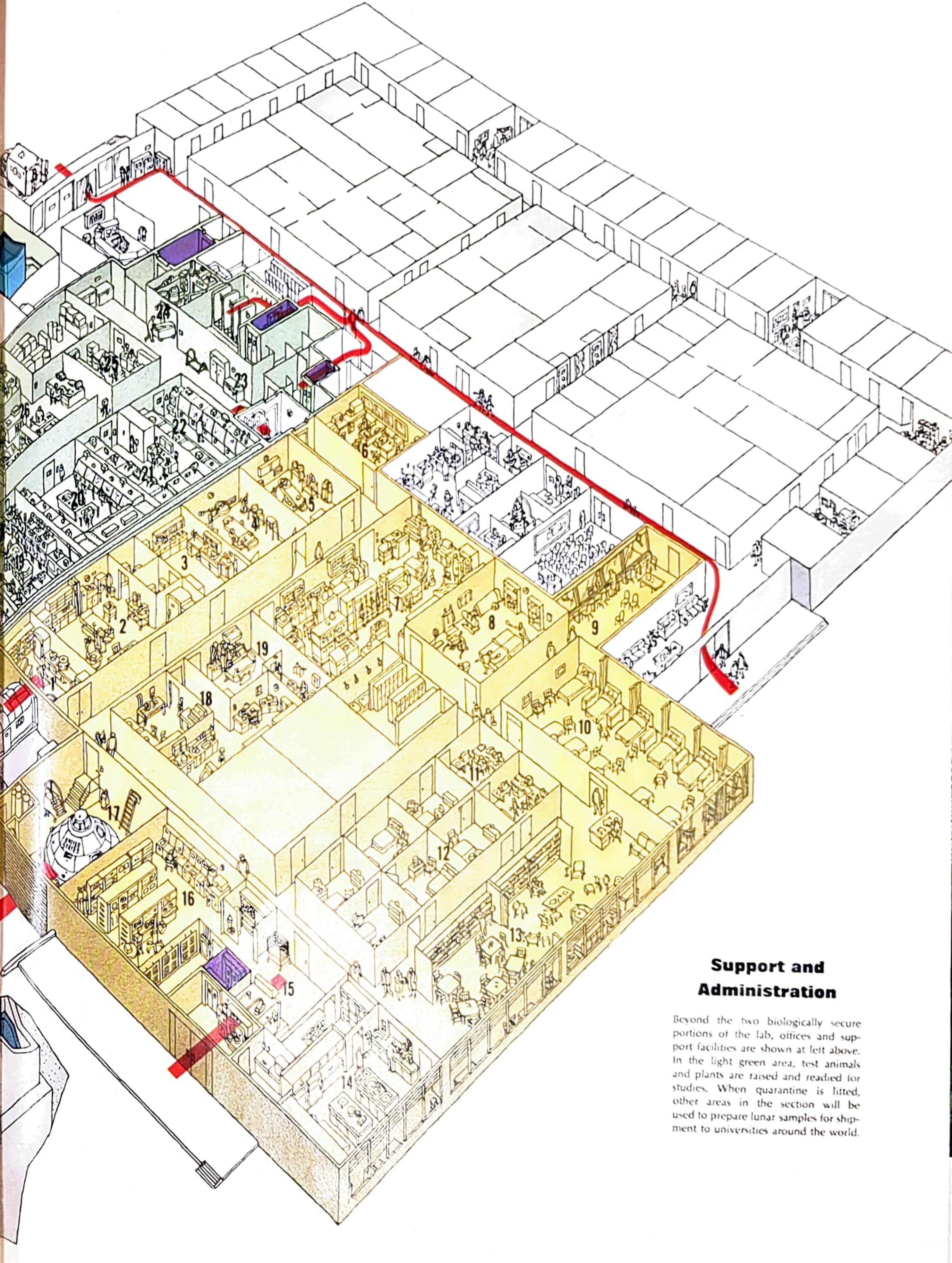
Quarantine area where astronauts will live and be examined is shaded yellow. In an emergency, lunar lab workers could also be quartered there.

1 Crew reception area (connected to transfer van)
2 Medical and dental examination room
3 Medical examination room
4 Operating room
5 Tilt-table room for physiological testing
6 Tape-out room where data can be passed into nonquarantine area electronically
7 Biomedical lab—clinical chemistries and immunology of astronauts and support personnel
8 Exercise room
9 Astronaut debriefing room, separated by glass from family visiting room
10 Dormitory for support personnel
11 Offices for astronauts and doctors
12 Paired sleeping quarters for three astronauts and their three attendant doctors
13 Lounge and dining room
14 Kitchen
15 Receiving room where food and laundry is sterilized passing in and out
16 Computer room for data storage from bio-medical lab (7)
17 Spacecraft storage, equipped with closed-circuit TV for inspection
18 Microbiology lab for clinical tests of quarantined personnel
19 X-ray room with fluoroscope and darkroom



Radiation Laboratory

Chips from the first lunar samples will be sent to a radiation lab (blue in drawing) built 50 feet underground. There, their radioactivity will be measured and results may help indicate the age of the rocks and whether they ever existed in molten form.



Support and Administration

Beyond the two biologically secure portions of the lab, offices and support facilities are shown at left above. In the light green area, test animals and plants are raised and readied for studies. When quarantine is lifted, other areas in the section will be used to prepare lunar samples for shipment to universities around the world.

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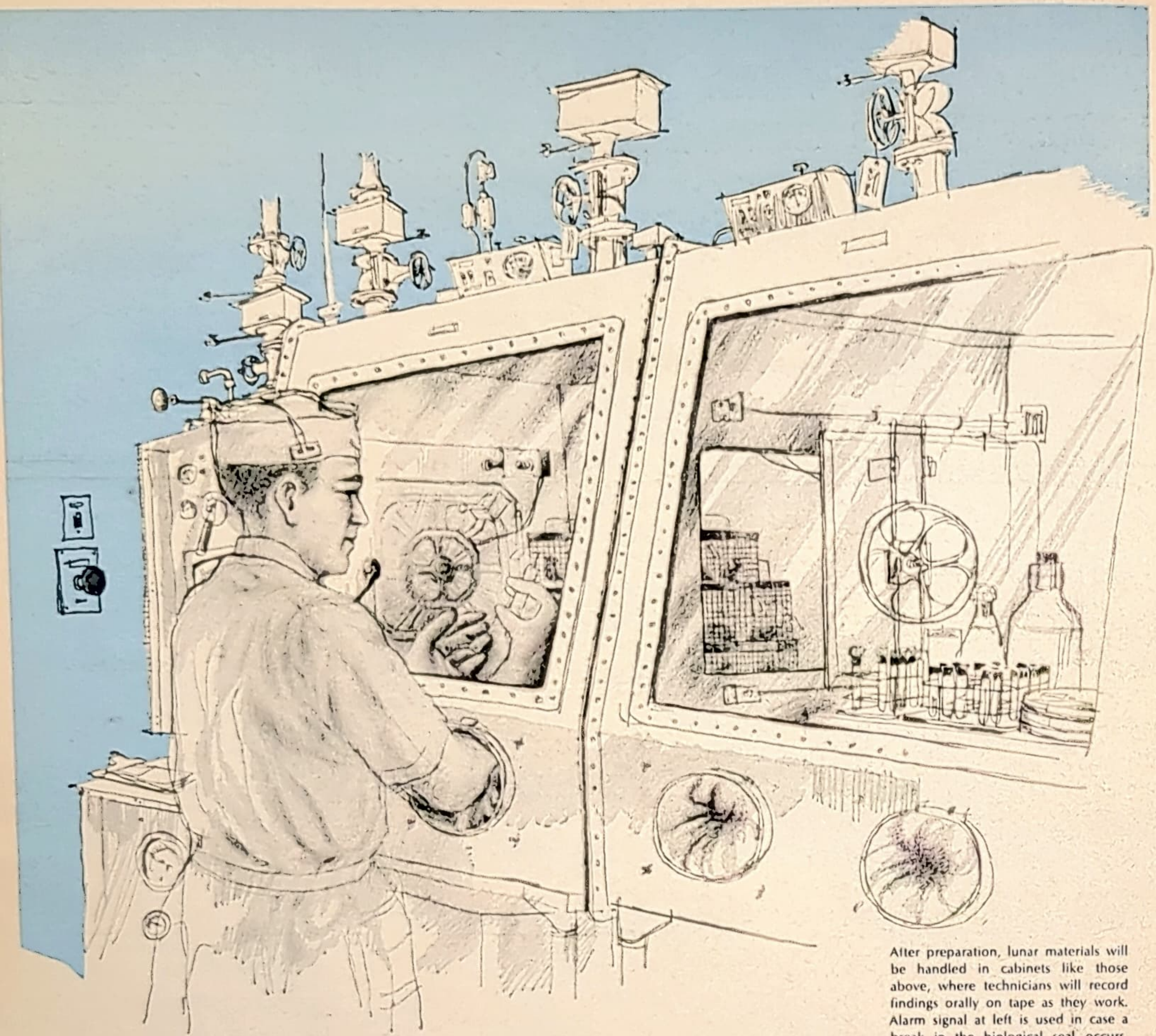

After preparation, lunar materials will be handled in cabinets like those above, where technicians will record findings orally on tape as they work. Alarm signal at left is used in case a break in the biological seal occurs.

A Close Watch on the Men and Their Prizes

by DORA JANE HAMBLIN

From the outside, the lab looks like nothing in particular—three bland stories of steel-and-sheetrock construction chastely designated Building No. 37 at the Manned Spacecraft Center. There is no hint of its exotic purpose or of its incredibly complex interior arrangements—the living quarters for the astronaut; the radiation counting lab 50 feet underground, most efficient in existence; the elaborate high-vacuum system in which tough moon rocks will be handled as delicately as peach blossoms; the intricate power, ventilation and sterilization systems designed to prevent accidental contamination. All of these are sealed away behind a two-way "biological barrier" beyond which both the astronauts and the moon samples will be quarantined—the men for more than two weeks, the samples for more than a month.

The Lunar Receiving Laboratory has three critical missions: first, to protect the earth and its life forms from any possibly harmful "moon bugs" the men may bring back either on their persons or in the rock samples they will collect. Second, insofar as possible to protect the moon samples from earth's foreign and therefore potentially destructive atmosphere. Third, and most important, to break both of these barriers under rigidly controlled conditions and expose the earth and the moon to each other.

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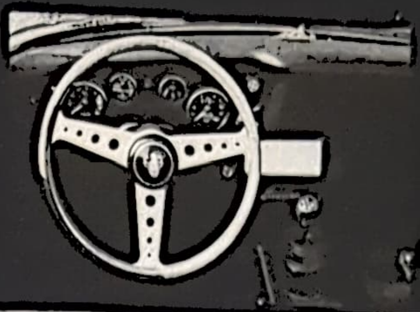

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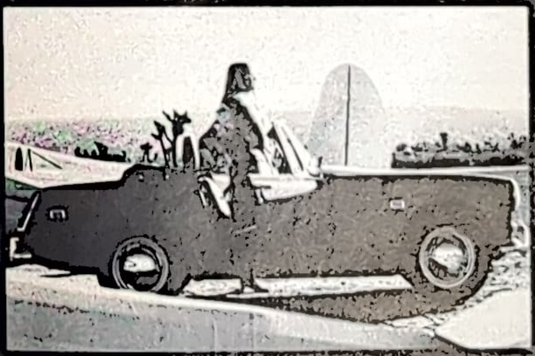

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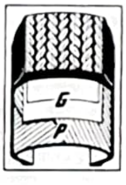

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Apollo 11's contamination problems will begin with one of the first acts of the first man to step onto the moon. He will bend over right where he stands, scoop up about a pound of whatever material lies at his feet, seal it carefully in a plastic bag and tuck it into a leg pocket of his spacesuit. This is a "contingency sample," already almost hopelessly corrupted by exposure to the exhaust of the moon landing craft and contact with the astronaut's suit and body. Later in their 2⅓ hour walk on the moon—assuming other tasks permit—the two lunar explorers will search a bit farther afield for geologically different specimens of moon rock. With great care, they will put these samples inside two especially prepared sterile aluminum boxes with triple vacuum seals. On the homebound flight the boxes, each holding a maximum of 25 pounds of moon material, will be further wrapped in protective plastic bags.

When they start back, the astronauts will leave their outer shoe coverings and their back packs on the moon, reducing the chances of carrying contaminants back to earth. Before they reach the vicinity of earth they will go over the interior of the command module with a vacuum cleaner to pick up (and trap in chemical filters) any stray particles of moon dust that may have found their way there.

At splashdown in the Pacific the astronauts will get out of their spacecraft and into a raft and immediately put on sacklike biological isolation garments (called BIGs) which will completely enclose their spacesuits. They will then be helicoptered aboard the recovery carrier and moved—again immediately—into a specially-constructed, biologically sealed van. The raft in which they rode briefly will be scrubbed down with disinfectant by a frogman and then sunk. The astronauts will stay sealed up in total quarantine, along with a flight surgeon and a technician, for a fairly leisurely—if isolated—trip back to the nearest land. There the sealed van will be put aboard a jet cargo plane and flown to Houston.

The rocks will have beaten them there by a good bit. They'll be put aboard the nearest jet, flown to Ellington Air Force Base near Houston, and rushed by car to the Lunar Receiving Laboratory. The reason for the haste is scientific: plucked from the no-atmosphere vacuum which is their natural environment, the moon rocks will begin to deteriorate, or lose their special lunar qualities, the moment they leave the moon. Precise experiments designed to measure the rocks' radioactivity, to search for traces of a magnetic pole on the moon, to analyze the gases emitted from the rocks, require the utmost haste. Delay might mean losing the telltale traces the scientists seek, or risk confusing them by exposure to the earth's atmosphere.

Once in the laboratory, the boxes will be stripped of their plastic bags and put through a triple lock chamber for sterilization of the outside. Then they move into a vacuum chamber which will be gradually pumped down to a vacuum approximating that on the moon itself. Working from the outside of the chamber, with his hands inside glove ports reaching to the interior, a technician will prepare the first experiment: he will puncture a diaphragm seal on the box and plug a flexible tube through it to the box's interior. Any lunar gases trapped inside will pass up to a rare-gas mass spectrometer, an instrument which detects and identifies gases. The test will immediately show whether the box has leaked and let earth atmosphere inside to corrupt the samples, and it will locate and identify any gases present that do not originate in the earth's atmosphere.

This done, the technician will break the box's triple seal, and begin lifting out the fragments one at a time. As each bit of the moon emerges it will be set on a little tray and lifted to the top of the vacuum chamber. There six fixed cameras will photograph it from every angle and record its precise dimensions. Scientific observers stationed on a sort of catwalk at the rear of the chamber will peer down at the specimen through microscopes, and attempt by visual observation to make a guess at its components and characteristics.

The chance of finding anything living: one in a hundred billion

The sample then moves along a monorail, still within the vacuum complex, to a second chamber where the vacuum is pumped down even further. In this ultra-high-vacuum chamber not even glove ports are considered secure enough to avoid corrupting the sample. Here the technician works entirely from the outside, manipulating mechanical arms and hands inside. His job is to take samples of the samples. Using sterile tools laid out for him on a rack like a lazy Susan, he breaks loose miniscule flakes or chips from each rock, packages them in individual vacuum containers and then seals the original chunk in a package of its own for storage.

Some carefully chosen chips will be rushed immediately to the radiation counting laboratory underground, others to the magnetics lab close to the vacuum complex itself. The radiation lab will test samples for ordinary radioactivity and for radioactivity induced by cosmic rays, both of which are clues to the age of the rock in question and to whether or not it ever existed in molten form. Did the moon begin life hot, and then cool off? The magnetics lab will search for traces of magnetic monopoles, evidence that there is, or was, a magnetic pole on the moon.

Throughout the process of opening the boxes, sorting the samples and making the tests, scientists and technicians will wear foot-operated voice recorders so that they can put on tape moment-by-moment accounts of what each sample looks like, what they are doing to it, and where it goes next. Master controllers will monitor each step on closed circuit TV via electronic scanning devices. They will direct the operations according to a plan as detailed and complex as a flight plan for Apollo itself. Throughout the operations the sample flow will be documented, with written and photographic records. If something should go wrong scientists will have a clear picture of what happened.

"The chance of bringing anything harmful back from the moon is probably one in a hundred billion," says Persa R. Bell, manager of the Lunar Receiving Laboratory. "The chance of finding any living organism is about as small. None of the organisms we know could grow on the moon, though some might be able to survive there. They couldn't grow, and they couldn't evolve. If we find traces of life forms they'll likely be our own earth forms because our storms, explosions, hurricanes, etc. toss spores and other materials up into the high atmosphere all the time. There they get caught in the earth's magneto trail, which sweeps periodically across the moon and could leave these forms there."

Nevertheless, Bell and company are taking no chances. The vacuum system and the cabinetry in which all experiments are performed through glove ports form a primary barrier against any leak, or "spill" as the scientists call it. Outside of the cabinetry there is a second barrier formed by a complicated air-conditioning and pressure system which maintains a "negative pressure" inside the laboratories. That means there is slightly less air pressure inside than in normal atmosphere outside, so that any leakage of air would be from the outside into the labo-

Persa Bell, manager of lunar lab, scans an Apollo 10 photo

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Lab CONTINUED

ratories, not from the laboratories out. Technicians and experimenters are free to come and go to their jobs throughout the quarantine period, but each must shower and change clothes both going and coming, and each must pass to and from his job through a sterilizing ultraviolet lock. "We will be," says one, "the cleanest 200 people in the U.S. at the end of this." Should an accidental "spill" occur in cabinetry and expose workers to possible contamination, they will be quarantined inside the building for the duration of tests. No dormitories have been set up for this purpose, but the building's halls were designed to be wide enough for sleeping should an emergency occur.

The astronauts, meanwhile, will have arrived—still in their sealed van—at Ellington AFB, where a trailer will haul the rig to the lunar lab. They will enter, to begin their quarantine and debriefing, through an elongated airtight plastic tunnel set up between van and laboratory.

A British journalist has described the astronauts' quarters there as a "moon palace," whatever that might be. Each astronaut will have a neat single bed with a night table, a reading light and the wide-awake attention of a physician 24 hours a day. The quarters are definitely government spartan. There is a lounge, a dining room, an exercise room and one of the most complete biomedical research facilities in the U.S. to check out the Apollo 11 crew. Physicians will have made radiation and blood counts on the three immediately after they splashed down. Inside the lab they will undergo an exhaustive series of medical tests—as is customary after every space flight. But this time the procedure will be more elaborate. The men will be observed clinically, chemically, and via microbiology; they will undergo immunology tests to determine changes, if any, in their immunoglobulins after being exposed to the moon.

They also face the customary 10- to 14-day period of technical debriefing. This too will be performed inside the quarantine area. But the astronauts will talk with debriefing officers from behind a glass barrier, through which they can also wave at their visiting wives and families. The air they exhale will be passed through biological filters and then "burned" to sterilize it further. ("What you get," says a technician, "is hot air.") Body wastes will be steam-treated, and every scrap of paper that goes out to be recorded or handled on the outside must pass through a 16-hour special locking-out process of exposure to ethylene oxide.

When the demands of the first time-critical experiments on the lunar rocks have been met, other samples from the high vacuum chamber will be sent back through the vacuum system and down into one of two separate tube systems which lead to laboratories on the floor below. One set of tubes goes to the gleaming aluminum cabinets of the physical-chemical test lab, the other to the biological test lab. In the first, scientists will weigh each little chip in its container, study it with microscopes, and then open a valve on the bottom of the container to expose the moon fragments to such common earthly elements as nitrogen, oxygen and water vapor. None of these elements would cause a reaction in an earth rock, but so far as anyone knows the moon rocks have never encountered water, oxygen or nitrogen. They could react violently. No one at the lab really expects them to explode, but they might disintegrate, or they might display a sharp temperature rise. "If there are any moon bugs in them, that temperature rise should take care of *them*," says one investigator.

Clues that may lie in the rocks: Was there water? Was there life?

Assuming that the precious moon fragments are not destroyed or affected violently by earth atmosphere, other fragments will be removed from their containers and scientists will commence further study of their mineral and chemical components and structure, all of which are clues to the origin and history of the moon; what materials lie on its surface, what forces made them, in what epoch of the universe's history were they born? Perhaps they can tell us if once the moon lived, and then died; if eons ago it had water; if indeed it may be some sort of "young" planet still trying to evolve into a form of earth.

Fragments which refuse to reveal their structure under a microscope may yield to an X-ray diffraction machine which will analyze their mineral composition, or to a burning arc which will actually burn the little sample and photograph the light of its flame in color. Each element known to man emits light at its own particular wave length when it burns, and the laboratory's sophisticated equipment can separate and identify these elements.

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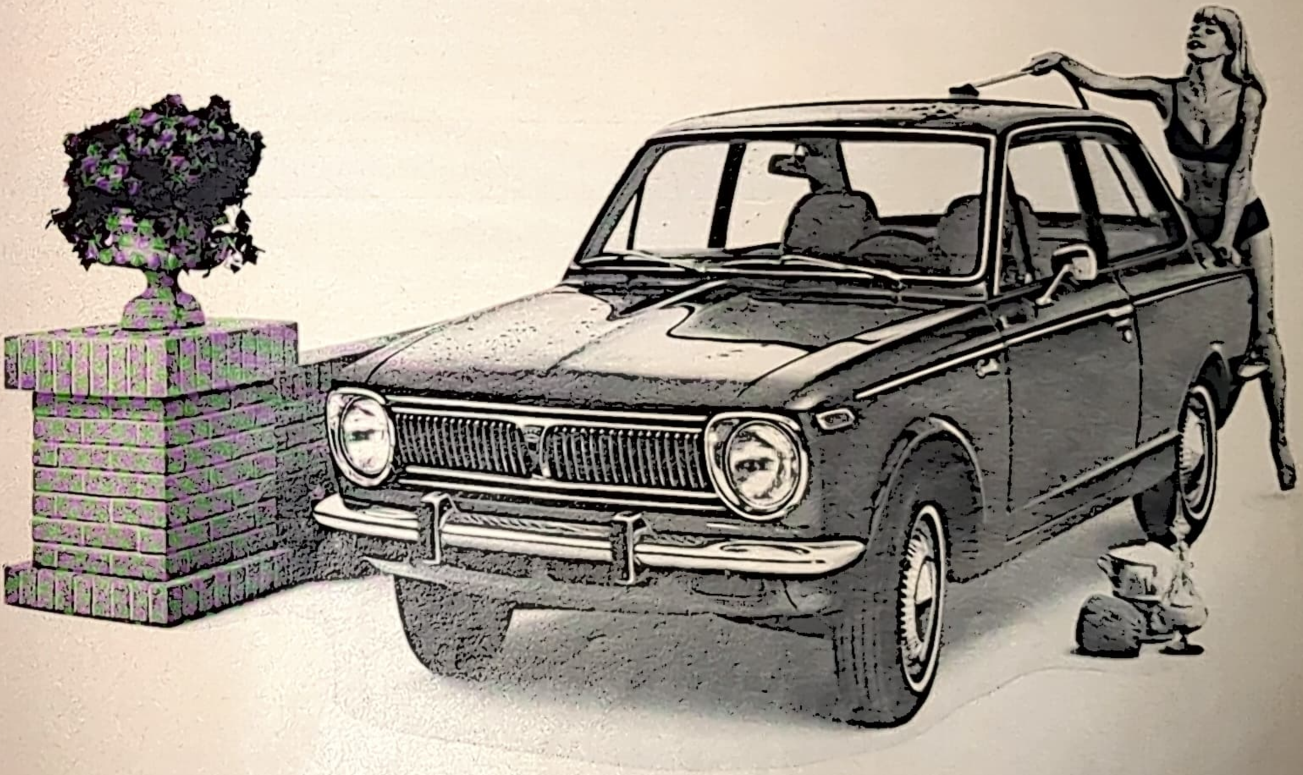

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The most exciting experiments, in many respects, will be going on in the biology lab across the hall where scientists will be trying to determine whether biological contamination, of possibly disastrous proportions, is or is not a problem.

Separate sets of tiny samples will be pulverized there and fed to carefully cultivated colonies of mice, birds, fish, insects and plants. Months of preparation have gone into this experiment, to achieve germ-free specimens that will be highly sensitive to any strange form of organic life that might exist in the moon material. Technicians had little trouble getting together batches of Japanese quail, several kinds of algae, shrimp and the hardy sunflower, but they tore their hair over the cultivation of pine seedlings—which the U.S. Forestry Service particularly wanted to test—and they had considerable woe over the mice. Ordinary mice were easy, but the germ-free specimens, delivered by Cesarean section in sterile surgery, turned out to be so hard to raise that the lab lost three batches of them during trial runs and tests of the systems.

Having ingested the moon-food mixtures, both plants and animals will be watched to see what happens. Here it is, of course, that science fiction fans may dream their impossible dreams. If an oyster, having gulped down a lunar lunch, turns into a man-eater, there will be several dozen of the most startled scientists in the world inside the lunar receiving laboratory.

Any change at all in the specimens would make the staff happy

Not one of them anticipates any such thing, but few deny that it would make them deliriously happy if such an outrage occurred. Any change at all, any mutation large or small, would keep them happily at work for months. But they are likely to be disappointed.

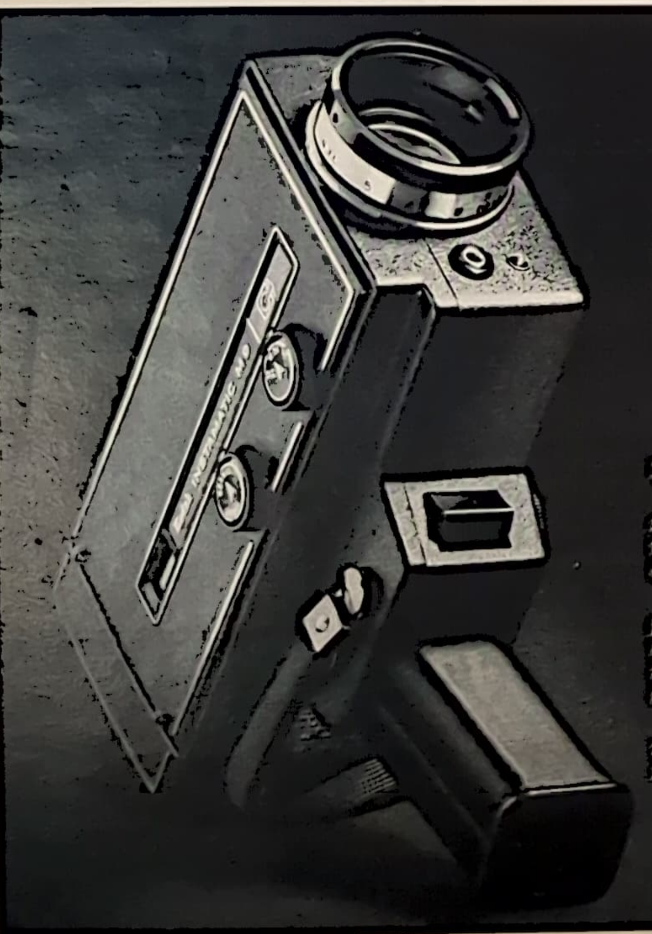
At the end of 21 days, if the astronauts have exhibited no symptoms of lunar contamination and if no anomalies have cropped up in the lunar-fed plants and animals, the men will be released.

"Let us hope," says Apollo 11 Astronaut Michael Collins fervently, "that none of those mice die."

Work on the rocks, however, will go right on. Because painstaking as all the plans and experiments inside the lab are, most of them are preliminary. More detailed work of analysis and study will be done by some 150 scientists, whom NASA calls "principal investigators," scattered around the world at universities, research centers, government agencies. It is most unlikely that man will ever land twice at the same spot on the moon, so the precious pounds which come back from the first landing site are, even now, more in demand than parking places in a rainstorm.

Scholarly requests for lunar samples began to come to NASA from around the world long before the lab was ever built. In 1965 NASA consulted with the National Academy of Sciences and its Space Science Board to draw up lunar sample procedures. Two outside committees of experts were formed, one called the preliminary examination team (PET), the other the sample analysis planning team. Members of PET will work inside the lab to help catalogue, sort, test and describe samples in quarantine. From these findings the planning team will decide just which professor gets what rock. Men from a host of American universities, government agencies and research organizations have submitted precise plans and descriptions of experiments they wish to perform, and so have scientists from Britain, Japan, Germany, Canada, Finland, Switzerland. No request of any sort has yet come from the Soviet Union.

After all the experiments are done, the scientists must return the fragments to Houston or else have a very good explanation of just what they did with them. The great bulk of the moon material, the first that human beings ever had in their hands or in their test tubes, will remain in Houston stored in a high vacuum. In case man doesn't go to the moon again, it will be there for further, second-generation experiments, or as a permanent collection from Earthman's first great interplanetary adventure. ◂



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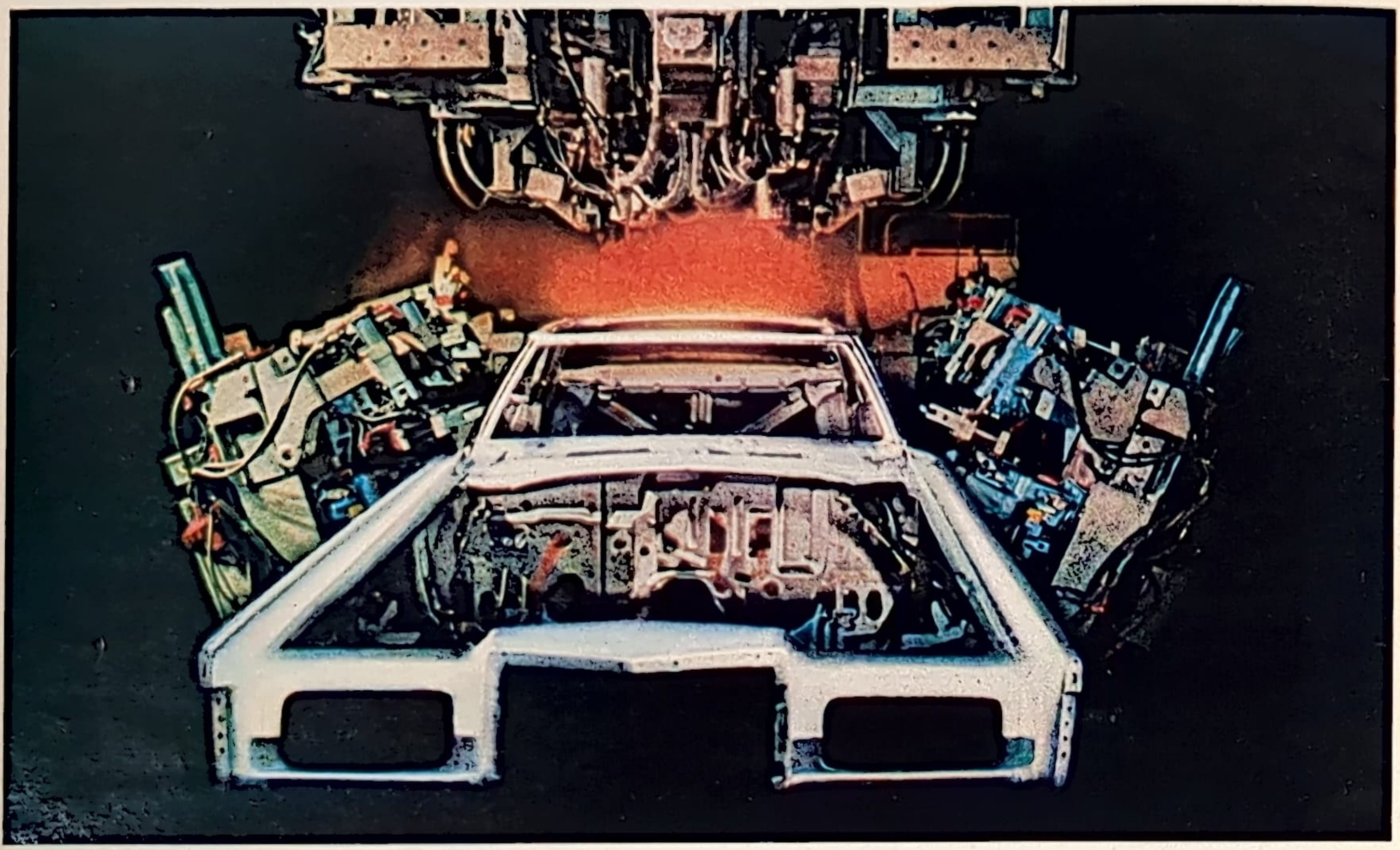

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Forty-two years after another historic flight

A Letter from Lindbergh

Charles Lindbergh at 25, just before his 1927 transatlantic flight

Forty-two years ago Charles Lindbergh completed one of the great adventures of modern time, the first solo flight from New York to Paris. In the '30s he became involved in the beginning of the space age, raising money to support America's rocket pioneer, Robert Goddard. Last December he was at Cape Kennedy to meet the astronauts and to watch the launching of Apollo 8.

A LIFE editor, who is also a personal friend, asked Lindbergh if he would write an article for this special issue about the motivation behind man's great adventures in history, including the forthcoming landing on the moon. Lindbergh wrote back a long, detailed letter explaining why he could not undertake such an article. The letter itself was such an unusual document that LIFE asked and received Lindbergh's permission to publish it.

Your suggestion that I assess the astronauts' moon mission in the context of other great adventures in history, and the motives behind them, tempts me. But years ago I decided to stop writing articles about aviation and astronautics.

Aviation and astronautics were once my prime interests. As a student pilot, at the age of 20, when aviation was much more dangerous than it is today, I concluded that if I could fly for 10 years before being killed in a crash, I would be willing to trade an ordinary lifetime for that experience. In the '30s, I assisted Robert Goddard, the father of spatial conquests. Standing with him on New Mexico plains at the foot of his converted-windmill launching tower, it seemed to me that the greatest adventure man could have would be to travel out through space.

What motivates man to great adventures? I wonder how accurately these motives can be analyzed, even by the participants themselves. When I think of my own flights in the early years of aviation, I realize that my motives were as obvious, as subtle and as intermixed as the waves on oceans I flew over. But I can say quite definitely that they sprang more from intuition than from rationality, and that the love of flying outweighed practical purposes—important as the latter often were.

For instance, I believed that a nonstop flight between New York and Paris would advance aviation's progress and add to my prestige as a pilot—with ensuing material rewards. In seeking financial backing for that 1927 flight, I argued that it would bring closer the golden era of air transport I felt was bound to come. But without my love of flying and adventure, and motives I cannot even now discern clearly, it was a flight I would never have attempted.

Then, as the art of flying transposed to a science, I found my interest in airplanes decreasing. Rationally I welcomed the advances that came with self-starters, closed cockpits, radio and automatic pilots. Intuitively I felt revolted by them, for they upset the balance between intellect and senses that had made my profession such a joy. And so, as intuition had led me into aviation in the first place, it led me back to an early boyhood interest, the contemplation of life.

Gradually I diverted hours from aviation into biological research. How mechanical, how mystical was man? Could longevity be extended? Was death an unavoidable portion of life's cycle or might physical immortality be achieved through scientific methods? What would be the result of artificially perfusing a head severed from its body? This question, especially, intrigued me and resulted in my working intermittently for several years in the Department of Experimental Surgery of the Rockefeller Institute for Medical Research. There, in collaboration with the great surgeon Alexis Carrel—he developing the operative techniques, and I the design of equipment—I constructed an apparatus that, for the first time, could pump synthetic blood through organs without the entrance of infection.

To me, my years at the Rockefeller Institute involved great adventures. They convinced me that the cycle of life and death is es-

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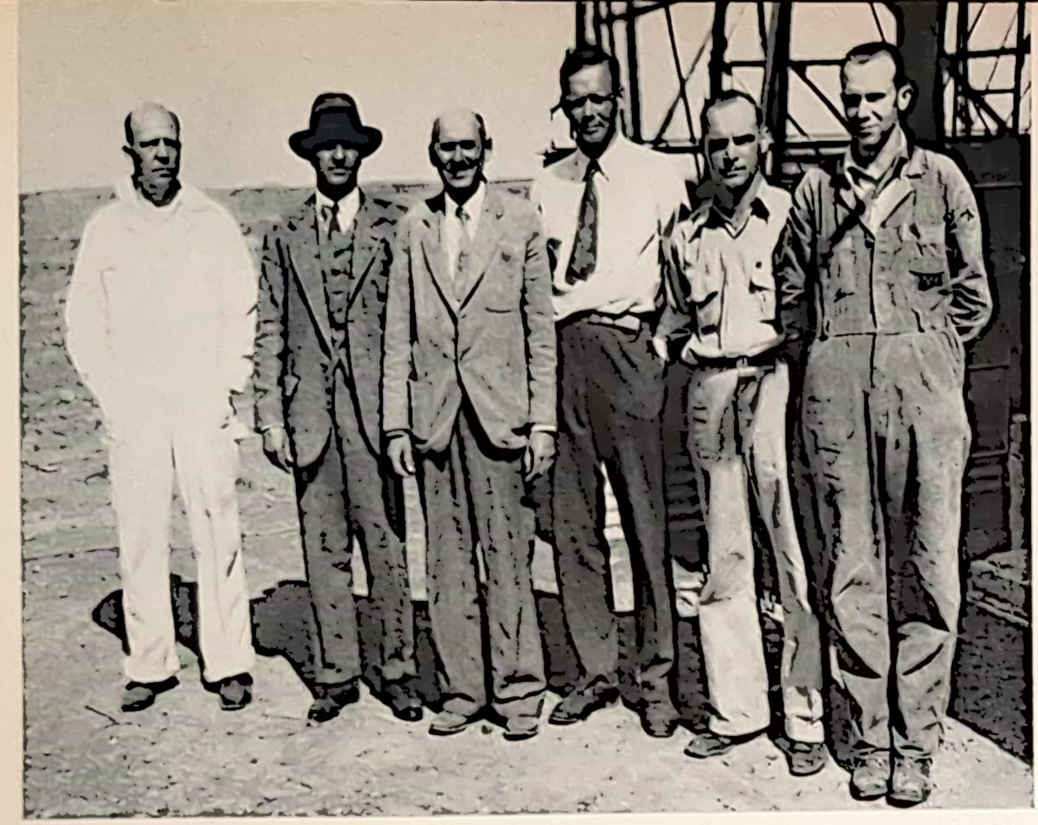


In 1935 Lindbergh and space pioneer Robert Goddard stood together in the center of a group at Goddard's experimental rocket-testing facility in Roswell, N. Mex.

LINDBERGH CONTINUED

sential to life's progress, and that physical immortality would be undesirable even if it could be achieved. I found the mechanics of life less interesting than the mystical qualities they manifest. With these conclusions, I began studying supersensory phenomena and, in 1937, flew to India in the hope of gaining insight to yogic practices.

But the approach and explosion of World War II immersed me in military aviation and international politics. Man's fundamental need of survival, for both individual and group, separated me from projects I would have carried out in peaceful times. After our fighting war was over (I had worked on the production of bombers and fighters, and flown 50 combat missions with the Army Air Force and Marines), the cold war with Russia held me to militarily oriented tasks—the study of new weapons, the reorganization of the Strategic Air Command, the essential need of developing intercontinental ballistic missiles.

I served for seven years as a member of scientific ballistic-missile committees, first under the Air Force and then under the Department of Defense. At the end of this time, with Atlases and Titans in position, with Minutemen coming and Polaris submarines under way, I felt our United States had achieved the indestructible power to destroy any enemy who might attack. But I had become alarmed about the effect our civilization was having on continents and islands my military missions took me over—the slashed forests, the eroded mountains, the disappearing wilderness and wildlife. I believed some of the policies we were following to insure our near-future strength and survival were likely to lead to our distant-future weakness and destruction. Also, I was tired of windowless briefing rooms, Pentagon corridors and the drabness of standardized air bases. I wanted to regain contact with the mystery and beauty of nature.

I resigned from the ballistic-missile committee and declined a position in the new civil agency being set up for the development of space. I decided to study environments, peoples and ways of life in various areas of the world. To make this possible, I returned to my prewar position of consultant to Pan American World Airways.

Wilderness expeditions in Africa, Eurasia and the American continents brought me to an appreciation of nature's extraordinary wisdom. I found myself in the fascinating position of moving back and forth between the ultracivilized on the one hand and the ultraprimitive on the other, with a resulting clarity of perspective on areas between—a perspective that drove into my bones, as well as into my mind, the fact that in instinct rather than in intellect is manifest the cosmic plan of life.

Then, a few months ago, I received an invitation from Apollo 8's astronauts to attend the launching of their mission to orbit the moon. This plunged me back into astronautics as World War II had plunged me back into aviation, though for a period of days instead of years. I was literally hypnotized by the launching. I have spent most of a lifetime in close contact with test flying and man-controlled power; but I have never experienced anything to compare to that mission of Apollo 8.

Three miles away from the pad, where I stood watching with free-from-duty astronauts, the size of the rocket still seemed huge. When ignition came, clouds of smoke and flame churned like a storm's convulsions; and when the sound waves struck me, I shook with the earth itself.

Above that flashing, billowing chaos, the prow of the rocket rose. In it I visualized the three men I had lunched with hours before, strapped into position like test pilots, tensed to emergency procedures and to the dials of the instruments they watched, men actually launched on a voyage to the moon! For a moment, reality and memory contorted and Robert Goddard stood watching at my side. Was he now the dream; his dream, the reality?

During the first seconds of the Apollo's inching upward, my sensation was intensified by a vision of the last launching I had witnessed, that of a big military missile which rose three or four feet, faltered, and then crumpled into explosion—an explosion seemingly less violent than that smothering the whole aft end of the Apollo.

My body staggered with the rocket's effort to lift above its tower, relaxed as it leapt upward into air, thrilled as the ball of fire, with its astronauts, diminished in the vastness of space. Here, after epoch-measured trials of evolution, earth's life was voyaging to another celestial body. Here one saw our civilization flowering toward the stars. Here modern man had been rewarded for his confidence in science and technology. Soon he would be orbiting the moon.

Talking to astronauts and engineers, I felt an almost overwhelming desire to reenter the fields of astronautics—with their scientific committees, laboratories, factories and blockhouses, possibly to voyage into space myself. But I know I will not return to them, despite limitless possibilities for invention, exploration and adventure.

Why not? Decades spent in contact with science and its vehicles have directed my mind and senses to areas beyond their reach. I now see scientific accomplishment as a path, not an end; a path leading to and disappearing in mystery. Science, in fact, forms many paths branching from the trunk of human progress; and on every periphery they end in the miraculous. Following these paths far enough, and long enough, one must eventually conclude that science itself is a miracle—like the awareness of man arising from and then disappearing in the apparent nothingness of space. Rather than nullifying religion and proving that "God is dead," science enhances spiritual values by revealing the magnitudes and minitudes—from cosmos to atom—through which man extends and of which he is composed.

Forty-two years ago, bucking a headwind on a flight in my monoplane between New York and St. Louis, I tried to look into the future beyond man's conquest of the air. As the wheel had opened land to modern travel, and the hull the sea, wings had opened the relatively universal sky. Only space lay beyond. Could we ever extend our travels into space? If so, it seemed we must develop rockets and their jet propulsion. Such dreaming and reasoning brought me in contact with physicists, chemists and engineers in the explosives industry—and eventually with Robert Goddard. Who then could foretell that, as soon as 1968, men would hurtle around the moon and back?

Now, again, I try to penetrate the future. What travel may, someday, take place beyond our solar-system space? What vehicles can we devise to extend the range of rocket ships as they have extended the range of aircraft? Scientific knowledge argues that space vehicles can never attain the speed of light, which makes a puny penetration of the universe within a human lifespan; and that, therefore, cosmic distances will confine our physical explorations to those planets which orbit the sun.

As wings and propellers once limited man to earth's thicker atmosphere, scientifically established principles now seem to limit him to the space-territory of the minor star he orbits. We are blocked by lack of time as we were once blocked by lack of air. Mars and Venus may mark dead ends for spaceship travel, unless we break through physical laws and construct still-more-advanced vehicles.

But by establishing these new planetary "dead ends," are we cracking open the entrance to another era, as aviation cracked open that of astronautics—one that will surpass the era of science as the era of science surpassed that of religious superstition? Following the paths of science, we become constantly more aware of mysteries beyond scientific reach. In these vaguely apprehended azimuths, I think the great adventures of the future lie—in voyages inconceivable by our 20th Century rationality—beyond the solar system, through distant galaxies, possibly through peripheries untouched by time and space.

I believe early entrance to this era can be attained by the application of our scientific knowledge not to life's mechanical vehicles but to the essence of life itself: to the infinite and infinitely evolving qualities that have resulted in the awareness, shape and character of man. I believe this application is necessary to the very survival of mankind.

Science and technology inform us that, after millions of years of successful evolution, human life is now deteriorating genetically and environmentally at an alarming and exponential rate. Basically, we seem to be retrograding rather than evolving. We have only to look about us to verify this fact: to see megalopolizing cities, the breakdown of nature, the pollution of air, water and earth; to see crime, vice and dissatisfaction webbing like a cancer across the surface of our world. Does this mark an end or a beginning? The answer, of course, depends on our perception and the action we take.

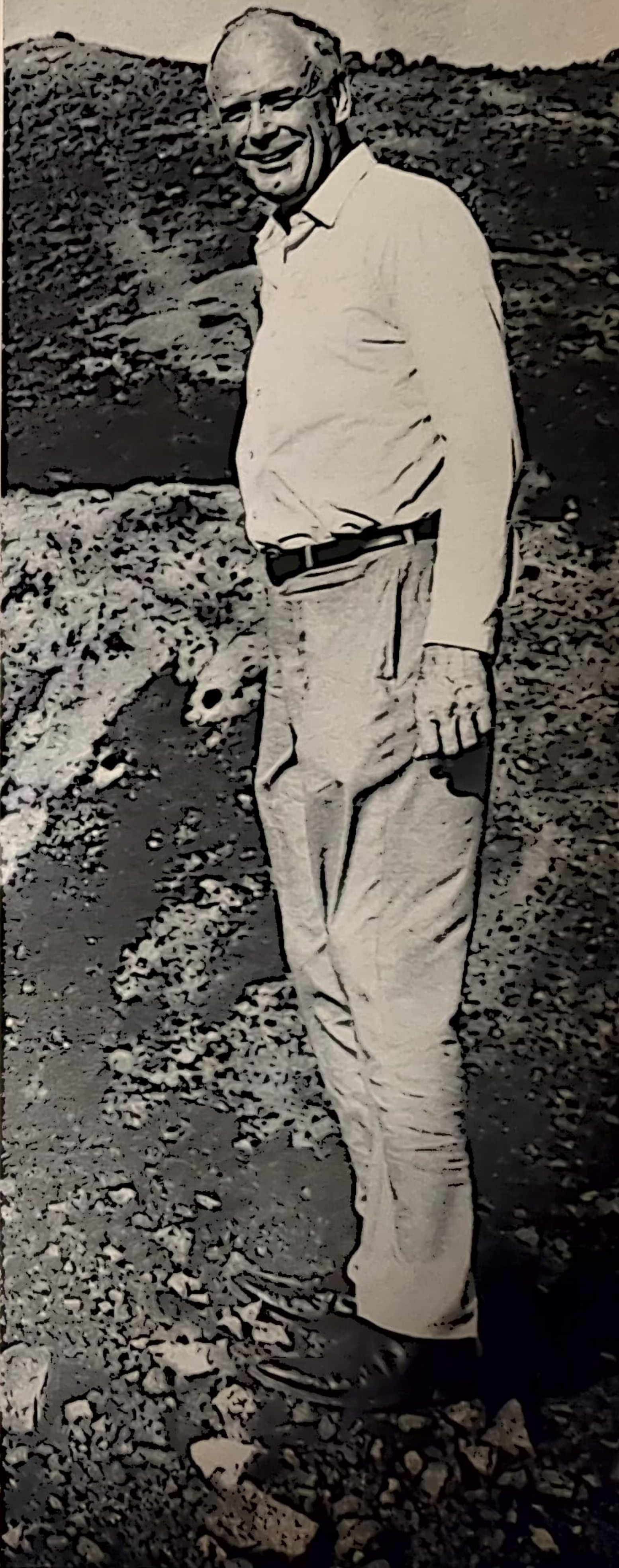
Every era opens with its challenges, and they cannot be met successfully by elaborating methods of the past. Our technologies become inadequate; but among our sciences—paleontology, genetics, physics, astronomy, atomics—are those that still can point a way, shaping concepts of life, time and space.

We know that tens of thousands of years ago, man departed from both the hazards and the security of instinct's natural selection, and that his intellectual reactions have become too powerful to permit him ever to return. It seems obvious that to achieve the maximum scope of awareness, even to survive as a species, we must contrive a new process of evolutionary selection. We must find a way to blend with our present erratic tyranny of mind the countless, subtle and still-little-known elements that created the tangible shape of man and his intangible extensions. Through the eons these elements have raised the human complex to a sensitivity which recognizes that both the material and the ethereal are varying forms of basic essence.

That is why I have turned my attention from technological progress to life, from the civilized to the wild. In wildness there is a lens to the past, to the present and to the future, offered to us for the looking—a direction, a successful selection, an awareness of values that confronts us with the need for and the means of our salvation. Let us never forget that wildness has developed life, including the human species. By comparison, our own accomplishments are trivial.

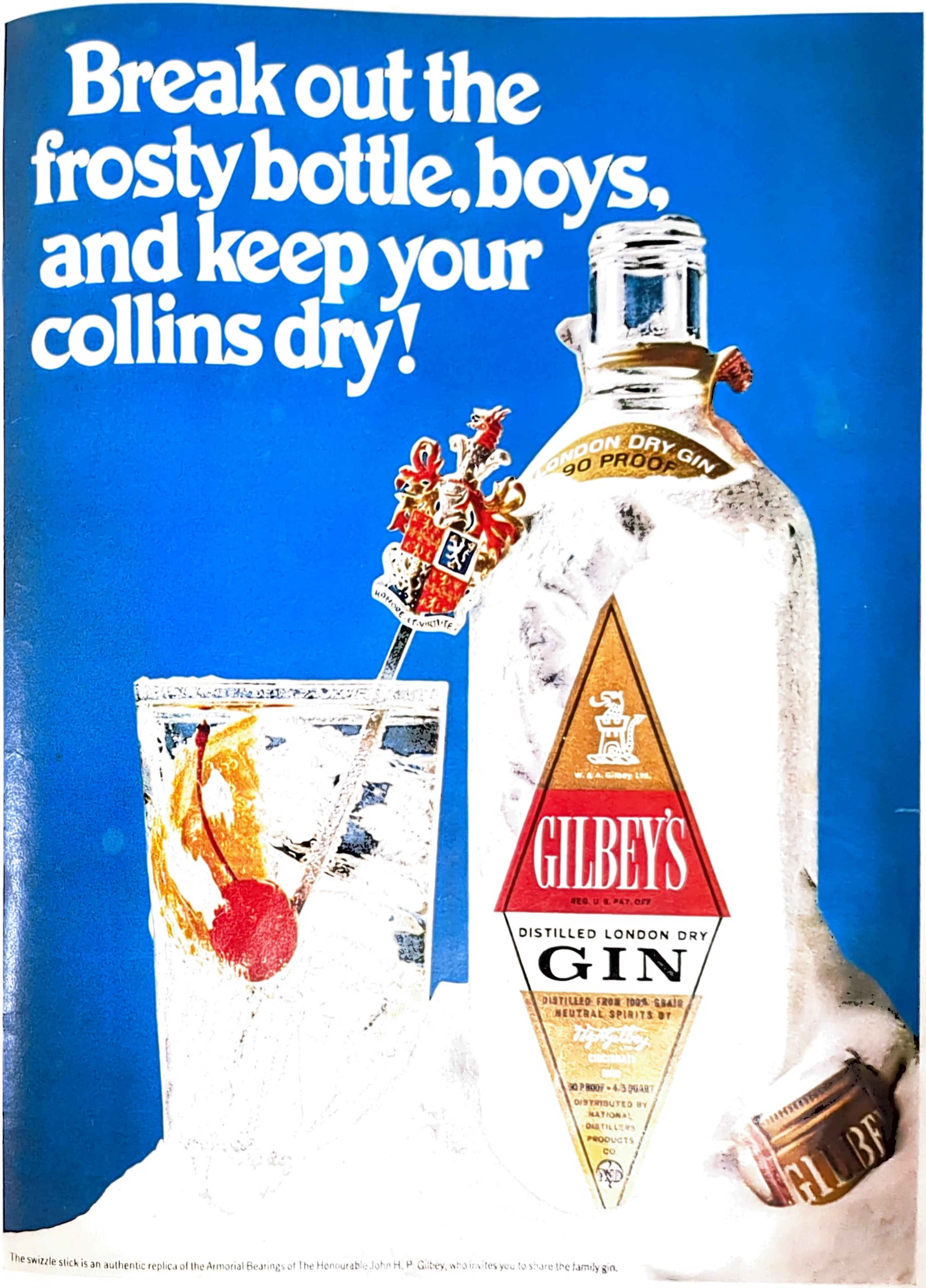
If we can combine our knowledge of science with the wisdom of wildness, if we can nurture civilization through roots in the primitive, man's potentialities appear to be unbounded. Through his evolving awareness, and his awareness of that awareness, he can merge with the miraculous—to which we can attach what better name than "God"? And in this merging, as long sensed by intuition but still only vaguely perceived by rationality, experience may travel without need for accompanying life.

Will we then find life to be only a stage, though an essential one, in a cosmic evolution of which our evolving awareness is beginning to become aware? Will we discover that only *without* spaceships can we reach the galaxies; that only *without* cyclotrons can we know the interior of atoms? To venture beyond the fantastic accomplishments of this physically fantastic age, sensory perception must combine with the extrasensory, and I suspect that the two will prove to be different faces of each other. I believe it is through sensing and thinking about such concepts that great adventures of the future will be found. ◂



Lindbergh stands on the slopes of Krakatoa volcano in Indonesia. Now, at 67, after four decades in aviation, he devotes much of his time to the cause of conservation.

MISCELLANY / HOLD STILL, MOON, WE'RE ON THE WAY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